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IMPACT EVALUATION:

LAC/Honduran Training Program

(Miami Dade Community College Training)

PROJECT NO. LAC 0622-C-00-3044-00

Tegucigalpa, Honduras

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INTRODUCTION

This Impact Evaluation of the LAC Honduran Training Program draws on information from the following sources.

1. Documents prepared by Dr. Marcia Bernbaum, Project Officer through July 29, 1984, provide the BACKGROUND for this report.

2. A Final Report and other documents submitted by Miami Dade Community College, were used for summarizing the activities of Phase I through Phase V of the project.

3. In addition to the above sources, personal interviews with the project participants and their supervisors, and training materials developed through the project were used for preparing the EVALUATION section of this report.

BACKGROUND

The contract was financed under the LAC Training Initiatives Project, a Regionally Funded Project under which Honduras has been receiving approximately \$350,000 a year since FY 1982. The contract formed part of a six phased activity for which Miami Dade Community College was responsible for all but the first and last phases.

24 Honduran electricians and mechanics, two-thirds line supervisors from private sector firms and one third from the National Skills Training Institute (INFOP), were to receive three months of skill up-grading in technical, supervisory, and pedagogical areas in the U.S. Project participants were to impart their newly acquired skills to others once they returned to Honduras. Training was to be carried out in Spanish.

Training in technical skills was to be as individualized as possible. Competency based instruction was emphasized in the Request for Proposals (RFP) with preference being given to institutions which presented strategies based on this curricular strategy.

Participants were to be selected on the basis of their capability, interest in the program, and their employer's commitment to support activities which would allow trainees to provide instruction for their fellow workers in the skills they were to acquire.

The initial idea for the activity came from the Honduran private sector. Members of the private sector from an AID Advisory Committee on Human Resource Development played a key role in designing the experience Consejo Asesor para el Desarrollo de los Recursos Humanos de Honduras (CADERH). CADERH was involved in reviewing the RFP, recruiting candidates for the training program, selecting the training institution, and monitoring the implementation of the contract.

The six phases under which the activity was carried out were as follows:

Phase I: Recruit candidates.

Phase II: Select participants and conduct individual needs assessments to detect each participant's training needs as reflected in job performance requirements.

Phase III: Prepare individual training plans based on the information obtained from the needs assessments.

Phase IV: Train participants in the U.S.

Phase V: Follow-up of the participants in Honduras to assess supervisors' satisfaction with the training and to assist participants in implementing their training plans.

Phase VI: Outside evaluation of the experience by an independent contractor.¹

The statement of work was prepared in the fall of 1982 and the RFP was issued in early February of 1983. Eleven proposals were received from community colleges, universities, and private sector institutions. Miami Dade Community College was awarded the contract on June 1, 1983. The final cost of the contract was \$251,751.77, over a twelve month period which ended May 31, 1984.

¹The RFP and the contract specified five phases and indicated that, as part of the fifth phase an impact evaluation would be carried out by an independent party. For the purposes of this report the fifth Phase has been divided into two phases (Phase V: Miami Dade follow-up and Final Report, and Phase VI: Impact Evaluation by an independent contractor).

PHASES I-V OF THE PROJECT

Phase I: The Recruitment of Candidates

The recruiting of 48 candidates was done by USAID/Honduras, INFOP, and CADERH. Miami Dade Community College was not involved in this phase of the project. All of the major geographical regions of the country were represented. The candidates were employees of larger industries, INFOP, and PVO training centers.

Phase II: The Selection of Trainees and Needs Assessments

Selection of Trainees

The responsibility of screening, interviewing, and selecting trainees was delegated to Miami Dade Community College. Technical pre-tests and interviews were used for assuring a degree of homogeneity among the participants. On-site visits were conducted at the factory or training center of each candidate, and the final selection of participants was based on the following criteria.

1. The candidate's technical, supervisory, and teaching skills (25 points).
2. The level of commitment expressed by representatives of the firm or training institution for using the participant for subsequent training of other employees or students (25 points).
3. The practicality of the plan submitted by the firm or training institution for implementing subsequent training programs in Honduras, which were to achieve a multiplier effect with the project's participants training other employees or students (25 points).
4. The possibilities of providing appropriate training in Miami for each candidate in their particular field of technical interest (25 points).

Some candidates were not accepted because of a lack of technical or teaching abilities. More frequently, there was a lack of commitment on the part of the candidate or a lack of interest on the part of the firm or institution to achieve a multiplier effect upon the trainee's return to Honduras. Other candidates did not have access to the machinery or equipment required for training fellow workers.

Of the 24 initial trainees selected, 6 were not able to take part in the training and replacements had to be selected. In the final selection there were a total of 15 participants for electronics training, 8 for machinists skills, and 1 for heavy equipment maintenance and repair -- for a total of 24 participants. The geographical distribution and representation from industry or training institutions were as follows.

Table 1

Geographic Distribution and Representation from Industry or Training Institutions of Trainees

City	Number of Participants	Other		
		Industry	INFOP	Institutions
Tegucigalpa	10	5	5	-
San Pedro Sula	8	7	1	-
La Ceiba	3	1	2	-
Danli	1	1	-	-
Choluteca	1	1	-	INCATEC
Yoro	1	-	-	CEVER
Totals:		15*	8	2*

*The Choluteca trainee works both in private industry and for a local training center.

Needs Assessments

Based on the needs assessments conducted by Miami Dade Community College, it was determined that the mechanics trainees would require training in machine set-up skills, precision work with specific tolerances, sharpening of cutting tools, and inventive uses of lathe and milling machine accessories. Participants and Supervisors also expressed interest in computer controlled lathes and milling machines, heat treatment techniques and tempering.

The needs assessments indicated that electrical skills trainees had training needs in basic electricity, introduction to solid state electronics, control systems for industrial motors, the fundamentals of integrated circuits, digital electronics, and linear devices. While some of the participants for machinist training had low math skills, the literacy and computational skills for electrical trainees were higher.

According to Miami Dade Community College, "the major shortcoming of the assessment phase was the heterogeneity of the participants selected." The Miami Dade Final Report went on to explain that there were two groups of trainees -- those who had received college level instruction, and those with only on-the-job, empirical knowledge. But the skills required of these two groups often overlapped. As a consequence, it was decided not to separate the two groups within their occupational clusters. The Miami Dade Community College Final Report, however, suggests that future programs of this type separate advanced and intermediate trainees based on literacy and mathematical scores on the CTBS or a similar exam.

There were also difficulties related to the technical skills needs assessments. There was a lack of correlation between pre-tests and the technical abilities of participants. The Miami Dade Community College Final Report suggests that more care should be taken with pre-tests for assuring that all candidates are tested under similar conditions.

Phase III: Preparation of Individual Training Plans

The following curricular outlines were developed by Miami Dade Community College.

Supervisory Skills

I. Supervisor Responsibilities (Human Relations)

- Worker attitudes
- Communicating with employees

II. Principles of Supervision

- Art of leadership
- Organization and the supervisor
- Task analyses
- Employee evaluations
- Supervisors and labor relations
- Accident prevention

III. Special Techniques for the Supervisor

- How to give orders and orientations
- How and when to impose discipline
- How to receive complaints
- How to handle problem employees

IV. Work Organization

Planning work hours
Analysis of worker productivity
Improving work methods
Calculating and controlling costs
Quality control

V. How to be Successful in your Profession

Time management
Practical uses of statistics

Pedagogical Skills**I. Preparing for Instruction**

Importance of the first day
Shop safety
Characteristics of an efficient instructor

II. Teaching Adults and Adolescents

Types of students and discipline
Learning factors and forming good habits
Teaching voluntary and captive audiences
Motivating adults

III. How Students Learn

Capacity to remember information
Instructional methods
Selecting the best method

IV. Psychological Reinforcement

Positive reinforcement
Negative reinforcement
Other reinforcements

V. Tools of Teaching

Black board
Projectors and slides
Other audiovisual materials

VI. Plans of Study

Planning and preparation

VII. Laws of Learning

Readiness
Effect
Participant involvement

VIII. Presenting the Lesson

Preparing the student (1st phase)
Presenting the lesson (2nd phase)
Applying the lesson (3rd phase)
Evaluating the lesson (4th phase)

IX. Examinations

Goals of examinations
Types of exams
Qualities of a good examination
Choosing good questions
What shouldn't be included in exams

X. Designing Instructional Modules

Preparing instructional modules for
Honduras

Industrial Electronics**I. Color Codes**

Resistors
Capacitors
Induction & coils
Ohm's law
Kirchhoff's law
RMS, point to point AC
Diodes, zeners, transistors, traicaos, SCR
Measurement and diagnostic equipment
Soldering techniques

II. Power Supplies

Transformers
Relays
Coils
Rectifier circuits
Voltage multipliers
DC motors

III. Diodes

Electro-optical isolators and breakers
Field effect transistors
Photo-electric cells

IV. Electric Motors

DC motors
Single phase motors
3 phase motors

V. Control Systems

Transducers and sensors (temperature, pressure, light, position, and vibration)

I.C. Lineals

555 timer

Phase locked loop

voltage control oscillator

VI. Operational Amplifiers

Basic theory

Practical applications

Simple

Dual

Power

VII. Control Systems (Advanced)

Basic logic

Relay logic

TTL logic

Boolean logic

Practical applications

Reading plans

Diagnostic and repair techniques

Industrial Mechanics**I. Shop Safety**

Introduction to machines

Reading plans

Metal classifications

Metal properties and heat treatment

II. Steel Making

Classifications of steel

Use of rules, scales, and calipers

Precision measurement

Vernier tools

III. Measurements

Set-up

Quality control

Files and saws

Threads and taps

IV. Metal Properties and Lathes

Lathe

Maintenance of the lathe

Set-up

Cutting tools and lubricants

V. Centering on the Lathe

- Filing and polishing
- Drilling and vices
- Shaping and angular cuts
- Individual projects

VI. Classification of Milling Machines

- Using vices and cutting tools
- Dividing heads
- Set-up and operation of shapers
- Classification of gears
- Fabricating gears

VII. Introduction to Heat Treatments

- Numerical controls
- Instruction to new machines (computerized metal working machines)

Phase IV: Training Participants

The participants arrived in Miami on September 4, 1983. They received several days of orientation and began their studies on the following Monday. The study plans outlined in Phase III above were followed with the exception of heat treatment techniques and the numerical control of computerized lathes for mechanics participants. The following activities schedule was adhered to from September 12th through November 18th, followed by two weeks of workplace experiences in Miami industries.

<u>Monday</u>	English	9:30-11:30
	Electronics	2:00-5:30
	Mechanics Theory	1:00-2:00
	Mechanics Lab	2:15-5:15
	Supervision/Instructor Training	6:30-9:30
<u>Tuesday</u>	Counseling	9:00-11:30
	Electronics	2:00-5:30
	Mechanics Theory	1:00-2:00
	Mechanics Lab	2:15-5:15
	Supervision/Instructor Training	6:30-9:30

<u>Wednesday</u>	Tutoring	9:00-12:00
	Electronics	2:00-5:30
	Mechanics Theory	1:00-2:00
	Mechanics Lab	2:15-5:15
	Supervision/Instructor Training	6:30-9:30
<u>Thursday</u>	English	9:30-11:30
	Electronics	2:00-5:30
	Mechanics Theory	1:00-2:00
	Mechanics Lab	2:15-5:15
	Supervision/Instructor Training	6:30-9:30
<u>Friday</u>	Tutoring	9:00-12:00
	Electronics	2:00-5:30
	Mechanics Theory	1:00-2:00
	Mechanics Lab	2:15-5:15
	Supervision/Instructor Training	6:30-9:30

Pre-tests and post-tests of participants showed improvements in participants' scores (see Appendix I for copies of the tests).

Vocabulary scores (Spanish) on the CTBS improved from an average pre-test score of 35.4 (88.5%) to 37.5 (93.7%), out of possible score of 40.

Reading skill scores (Spanish) on the CTBS improved from a pre-test average of 37.6 (83.5%) to 40.0 (88.8%), out of a possible score of 45.

Mathematical calculation scores on the CTBS increased from an average of 43.3 (90.2%) to 45.8 (95.6%) out of a possible 48 points.

Mathematical problems scores on the CTBS improved from an average pre-test score of 42.1 (84.2%) to 45.8 (91.6%), out of a possible score of 50.

These improved scores on the CTBS examinations were not very significant but improvements in scores on a technical mathematics test and electronics evaluation were more meaningful.

Miami Dade Community College prepared its own examination for technical mathematics. An average pre-test score of 7.2 (32.7%) was recorded, with an average post-test score of 12 (54.5%), out of a possible score of 22 -- see Appendix II for a copy of the examination).

A 69 item exam on basic electrical/electronic concepts was administered to the electronic participants. The average pre-test score was 23.3 (33.7%) and the average post-test score was 58.4 (84.6%) -- see Appendix III for a copy of the exam.

Unfortunately, no pre or post-tests were administered for the mechanics participants, for supervisory skills, or for pedagogical skills. Consequently, it is more difficult to evaluate the learning which took place in these areas.

Phase V: Miami Dade Community College Follow-Up of the Participants in Honduras

The follow-up evaluations conducted by Miami Dade Community College consisted of four specific evaluations of different aspects of the training program.

1. Robert Bueso, the supervisory skills instructor, evaluated the degree of satisfaction of managers of firms who sent participants to Miami Dade Community College (January 30, 1984-February 10, 1984), and also asked participants to evaluate the course.

2. Jesus Sarmiento, the electronics instructor, travelled to Honduras to evaluate and assist participants in beginning their training programs for their co-workers and students; and evaluate the results of the electronics curricula (February 20, 1984-March 29, 1984).

3. Jose Garardo, a Miami consultant with experience in Honduran industry, evaluated the machinist (mechanics) training and its application in Honduras (March 25, 1984-April 6, 1984).

4. Thomas Halloran, the project director, presented a summary report and suggestions for future training efforts based on observations made in Miami and Honduras (March 19, 1984-March 25, 1984).

Summaries of these evaluations are found in Appendix IV of this report.

IMPACT EVALUATION: PHASE VI

The Impact Evaluation of the training provided by Miami Dade Community College draws on various project documents, the Final Report submitted by Miami Dade Community College, personal interviews with the trainees and their supervisors, and the training materials developed through the project.

Interviews with Participants and Supervisors

An evaluation team of two independent contractors conducted personal interviews with the trainees and their supervisors during August of 1984. The contractors were Allan Greenberg, Technical Director of CADERH and contracted by Creative Associates, and Ned van Steenwyk, contracted by AID/Honduras.

Interviews with 23 participants were completed (one had left Honduras to return to his university studies in engineering in the U.S.). All of the supervisors were interviewed with some supervisors having several participants in the project (INFOP/Tegucigalpa had 5 trainees and INFOP/La Ceiba had 2). A total of 17 supervisors were interviewed. Interviews were conducted in the work places of the trainees and supervisors in Tegucigalpa, San Pedro Sula, La Ceiba, Danli, Choluteca, and Yoro.

A questionnaire was developed with the guidance of AID/Honduras and CADERH. Suggestions and information voids from the Miami Dade Community College Final Report were also taken into consideration in preparing the survey instrument. (Note: see Appendix V for a copy of the questionnaire).

The questionnaire was designed to address the following issues:

1. The extent to which training expectations were reached and the applicability of the training in the areas of technical, supervisory, and pedagogical skills and knowledge.

2. The identification of specific improvements in skills and knowledge which could be attributed to the training.

3. The types of instruction programs which have been conducted by trainees and their plans for future programs.

4. Suggestions for improving programs similar to the Miami Dade training program.

Training Expectations and the Applications of New Skills and Knowledge in Technical Areas

Electrical/Electronic

Table 2 provides an over view of how project participants and supervisors have evaluated instruction in the area of industrial electronics. It summarizes the anticipated technical skills and knowledge which electrical/electronic participants and supervisors hoped that the trainees would master. It also indicates whether or not the trainees have been able to apply the skill or knowledge, or whether participants and supervisors feel that it will be possible to apply these skills and the knowledge in the future.

It is important to note that there are significant differences of opinion between project participants and their supervisors in regard to some of the skills which they had anticipated the participants would learn in the following tables.

There are also differences of opinion regarding the degree to which skills were mastered and the applications of these skills in Honduran industry. And some skills which were learned were not anticipated by participants and supervisors, but were mastered and applied to varying extents.

Table 2 shows that electronics participants mastered more than they had anticipated but supervisors' anticipations were met less often. It was also noted that supervisors were generally less specific in their evaluations than trainees.

Table 2

Training Expectations and Applications of Electronic and Electrical Skills and Knowledge

Skills and Knowledge	Anticip.	Mastered	Applying	Future	Part Sup	Part Sup	Part Sup	Part Sup
Industrial Electronics	12	6	10	5	5	5	5	-
Use of Oscilloscopes	8	-	10	-	2	-	5	-
Blueprint Reading	4	3	4	2	-	2	1	-
D.C. Motors	3	-	4	-	2	-	2	-
Measure/Control Instrmnts.	2	3	3	2	1	2	1	-
Prev. Maintenance	1	2	-	1	-	-	-	-
Industrial Safety	-	2	1	2	-	1	-	1
Voltage Regulation	-	1	-	-	-	-	-	-
Soldering Techniques	1	-	-	-	-	-	-	-
Transformers	1	-	1	-	1	-	-	-
English	1	-	1	-	-	-	-	-
Oscillators	1	-	2	-	1	-	1	-
Signal Generators	1	-	3	-	-	-	1	-
Digital Logic	-	-	1	-	-	-	-	-
Power Supplies	1	-	1	-	-	-	1	-
Circuit Design	-	-	1	-	-	-	-	-
Use of Instructional Kits	-	-	2	-	-	-	-	-
Electro-Mechanics	-	1	1	-	-	-	-	-
Diagnosis and Repair of Electronic Modules	1	-	1	-	1	-	-	-
TOTALS:	37	18	46	12	13	10	17	1

Table 2 on the preceding page shows that supervisors were more positive on the applicability of electronic skills and knowledge learned. In contrast, trainees felt that 35 percent of the skills and knowledge mastered had no present or future application in their positions of employment.

Mechanics

Table 3

Training Expectations and Applications of Mechanical Skills

Skills and Knowledge	Anticip.	Mastered Part Sup	Applying Part Sup	FUTURE Part Sup
Heat Treatments/Tempering	3	1	-	-
Milling Mach. Operation	2	1	3	1
Industrial Mechanics	1	1	1	1
Sharpening Cutting Tools	-	1	1	1
Gear Fabrication	1	-	-	-
Submerged Arc Welding	1	-	-	-
Fab. of Replacement Parts	1	-	1	-
Diesel Motors	-	1	-	-
Precision Mechanics	1	-	5	2
Measurement Instruments	-	-	1	1
Technical Calculations	1	-	-	-
Properties of Metals	1	-	-	-
Maintenance Mechanics	1	-	-	-
Shop Organization	-	-	1	-
TOTALS:	13	5	12	7
				8
				4
				2
				2

The preceding table shows that 8 of the training expectations of mechanics participants and 2 training expectations of supervisors were not met. It is evident that problems in changing tutors and failing to follow the curriculum outline (not being able to teach heat treatments, tempering, and computerized machining systems) resulted in this training component being significantly less than what was anticipated by supervisors and trainees.

While a significant number of mechanical skills were mastered which were not anticipated by supervisors and trainees, they apparently did not meet the training needs of the participants. Trainees reported that only 67% of the mechanical skills mastered were being applied. Supervisors felt that fewer mechanical skills had been mastered, that only 67 percent of these skills were being applied, but that the remaining 33 percent would be applied in the future. Trainees also felt that 17 percent of the mechanical skills mastered might be applied in the future.

In contrast, trainees in electronics felt that nearly all of their expectations had been met but that only 65 percent of the electronic skills they had mastered were being applied or could be applied in the future: indicating that the technologies emphasized might not have been in harmony with Honduran industrial realities.

Further, the interviews recorded that 9 participants (30%) and 3 supervisors (18%) felt that they are not presently able to apply any of the skills which were taught, but only 2 participants did not think that they could apply at least some of what they learned in the future. And 1 participant said that he had not learned any technical skills which he did not know before.

Specific Improvements and the Applications of Technical Skills

Table 4 on the following page records the responses of trainees and their supervisors in regard to the specific improvements noted in technical skills, knowledge, and the use of new machines or equipment which could be attributed to the project.

The table reinforces the findings reported of Table 2 for electronics participants with 30 percent of the improvements noted in electronics skills, knowledge, and the use of new equipment are not being applied by the participants.

Table 4

**Specific Improvements in Technical Areas Noted by Electronic
(E) and Mechanics (M) Participants, Supervisors, and the Actual
Application of the Skill or Knowledge**

IMPROVEMENT NOTED	<u>None</u> (E)(M)Sup.	<u>Little</u> (E)(M) Sup.	<u>Some</u> (E)(M) Sup.	<u>Great Deal</u> (E)(M) Sup.	<u>Applying</u> (E)(M) Sup.
Tech Knowledge -	1	- 2	- 5	4 4	9 3 7 12 8 10
Tech. Skills	1 1 1	1 2 1	6 4	3 5 3 7	10 7 9
Operation of Equipment	1 2 4	1 1 1	5 3 2	7 2 2	10 2 4
Sub-Totals:	2 3 6	2 5 2	16 11 9	21 8 16	32 17 23
Totals:	11	9	36	45	72(71.3%)

Table 4 shows that the improved skills, knowledge, and the use of new equipment by mechanics trainees are being applied in only 63 percent of the areas where improvements were noted by participants. This suggests that training may not have been sufficiently individualized for meeting each participant's individual needs.

Table 4 also shows that 10.9% of the participants and supervisors noted no improvement in technical skills, knowledge, or the use of new machines, and 8.9% felt that there had been little improvement in these areas.

Considering the little and no improvement responses together reveals that only 10% of the electronics participants responded in this manner as compared to 30% of the mechanics participants, and 24% in the view of supervisors.

Overall, 35.6% felt that their had been some improvement (39% for electronics participants, 41% for mechanics participants, and 27% in the view of supervisors).

44.5% indicated that there had been a great deal of improvement in technical skills, knowledge, and the use of new machines and equipment (51% for electronics participants, 29% for mechanics participants, and 48% in the view of supervisors).

Again, the electrical/electronics course achieved a higher rating by program participants, in regard to specific improvements in technical skills, knowledge, and the operation of new machines and equipment, than mechanics. But supervisors, as a group, seemed to be more satisfied with the results of the instruction provided than mechanics participants.

It was also noted that 78% of the skills which were improved to some degree or a great deal were being applied by electronics participants, as compared to 63% for mechanics participants, and in the view of supervisors 70% were being applied.

While the electronics course was rated the highest in regard to the immediate applicability of significantly improved skills, knowledge, and the use of new machines; it is also important to note that even for this group 22% of these improved skills are not being applied. This suggests that the original needs assessments of training and the instruction provided were not as individualized as they should have been.

Supervisory Skills

Table 5
Expectations and Applications of Supervisory Skills

Skills and Knowledge	Anticip.	Mastered	Applying	Future
	Part Sup	Part Sup	Part Sup	Part Sup
Supervision of Personnel	16	7	14	6
Production Planning	2	1	-	1
Preventative Maintenance	2	1	-	-
Personal Relations	2	1	5	1
Labor Relations	2	-	5	-
Evaluation of Personnel	1	1	1	-
Shop Organization/Admin.	-	1	-	-
Production Processes	1	-	1	-
Motivation of Co-Workers	-	-	-	1
Quality Control	1	-	1	-
Work Distributions	-	-	1	-
TOTALS:	27	12	28	9
				21
				9
				2
				-

Nearly all of the anticipated supervisory skills were mastered in the view of participants, but only 73 percent of the skills anticipated by supervisors were mastered. Virtually all of the skills mastered, however, have immediate and future applications according to both trainees and supervisors.

This conclusion is verified by Table 6 below with participants and supervisors noting that virtually all of the specific improvements noted in supervisory areas are being applied by the project participants.

Table 6

Specific Improvements in Supervisory Skills Noted by Trainees and Supervisors, and Extent of Actual Application

Specific Areas of Improvement Noted	Little or None Applying				Great Deal Applying			
	Part Sup	Part Sup	Part Sup	Part Sup	Part Sup	Part Sup	Part Sup	Part Sup
Personnel Supervision	4	3	4	1	15	7	16	7
Motivation of Personnel	3	2	11	5	9	8	18	7
Communication w/Workers	1	1	9	4	13	6	22	9
Communication w/Superv.	4	2	5	4	11	5	20	9
Evaluation of Personnel	4	4	8	3	10	1	14	5
Delegation of Responsib.	7	-	6	2	10	7	17	8
Conducting Meetings	7	4	6	2	7	2	12	5
Personnel Productivity	4	2	10	1	8	6	18	6
Industrial Safety	8	2	5	4	10	5	13	8
TOTALS:	42	20	64	26	93	47	150	64

While trainees and supervisors generally agreed that there had been little or no improvement in 21 percent of the specific skills listed above, they sensed that their had been some improvement or a great deal in 79 percent of these skill areas.

47 percent of the participants and 50 percent of the supervisors felt that their had been a great deal of improvement in the supervisory skills noted in Table 6. Participants and their supervisors also indicated that virtually all of the improvements in supervisory skills were being applied.

Pedagogical Skills

Table 7

Expectations and Applications of Pedagogical Skills

Skills and Knowledge	<u>Anticip.</u>				<u>Mastered</u>				<u>Applying Future</u>			
	Part Sup	Part Sup	Part Sup	Part Sup	Part Sup	Part Sup	Part Sup	Part Sup	Part Sup	Part Sup	Part Sup	Part Sup
Instructional Method.	14	5	10	6	8	6	2	-	-	-	-	-
Use of AV Mat/Equipment	1	-	-	-	-	-	-	-	-	-	-	-
TOTALS:		15	5	10	6	8	6	2	-	-	-	-

Only 67 percent of the anticipated pedagogical skills were mastered according to trainees, who appear to have been more interested in these skills than employers. Employers, however, who anticipated the mastery of these skills appear to be satisfied that they were mastered.

But only 67 percent of the trainees who mastered these skills, and 43 percent overall, felt that these skills had immediate or future applications, and even fewer supervisors felt that the pedagogical skills mastered had future or present applications.

Table 8 on the following page summarizes the improvements in pedagogical areas which could be attributed to the project, and the extent to which these improved skills are being applied.

Table 8

Improvements in Pedagogical Skills as Rated by Participants
and their Supervisors

Specific Areas of Improvement Noted	Little or None Applying			
	Part Sup	Some Part Sup	Great Deal Part Sup	Part Sup
<hr/>				
Identifying Instructional Needs	5	3	13	5
<hr/>				
Curriculum Development	4	-	11	4
<hr/>				
Evaluation of Trainees	4	2	8	2
<hr/>				
Instructional Skills	2	1	8	6
<hr/>				
Totals:	17	6	40	17
<hr/>				
	31	15	53	26

Table 8 above shows that 19% of the participants felt that they had experienced little or no improvement in pedagogical skills while in the view of their supervisors, there had been little or no improvement in 16% of the skills. Some improvement was noted by 45% of the participants and supervisors, and a great deal of improvement was reported by 36% of the participants and 39% of the supervisors.

The survey also showed that the participants were applying 60% of these improved skills in their work, according to participants, and 68% according to supervisors. This low application of improved skills is probably a reflection of (1) the fact that very few of the participants have begun training programs for their co-workers or students based on what they have learned through the project, and (2) the comparatively static nature of INFOP curricula which are prepared for instructors by a special office of curriculum development in the institution and do not allow for many modifications on the part of instructors.

When INFOP instructors and their supervisors were separated from the remaining participants and supervisors there was no appreciable difference in the evaluation of improved pedagogical skills. Both industrial and vocational education participants, and their supervisors had reached the same conclusions in regard to the pedagogical component of

instruction, but with the difference that only 50% of the improved pedagogical skills were being applied by INFOP participants while 60% of all of the participants were applying these skills.

The project had also anticipated that more emphasis would be placed on individualized and competency based instruction. When participants were asked if there was any improvement noted in regard to competency based instructional strategies, 68% replied that there was little or no improvement, 23% some improvement, and 9% a great deal of improvement; with 9% applying these improved skills in competency based instruction.

All supervisors said there was little or no improvement in competency based instruction skills, but one supervisor from a PVO training center, noted that the institution was applying the little that had been learned by the participant.

Summary of Anticipations, Skills Mastered, Skill Improvements and the Applications of Skills

Table 9 summarizes the findings of several of the preceding tables, but with an additional column which indicates the anticipated skills which were actually mastered by those who had expected to be trained in the specific skill.

Table 9

SKILL AREAS	Antici-	Antic.	Total No.	% Current	% Future	% Current &
	pated Skills	Skills	of Skills	Aplicat.	Aplicat.	Future Appl.
	Skills	Mastered	Mastered	of Skills	of Skills	of Skills
Electronics	55	45 (82%)	58 (105%)	40%	31%	71%
Mechanics	18	8 (44%)	19 (105%)	63%	21%	84%
Supervision	39	29 (74%)	37 (95%)	81%	5%	86%
Pedagogical	20	15 (75%)	16 (80%)	87%	12%	100%
TOTALS:	132	97 (73%)	130 (98%)	61%	20%	81%

Over-all one notes that the number of skills anticipated for mastery by participants and their supervisors was similar to the total number of skills mastered. But only 73 percent of the specific skills anticipated were mastered by those who had held these expectations.

Of the total number of skills mastered, supervisors and participants concluded that 29 percent of the technical skills in electronics and 16 percent in mechanics did not have current or future applications. Over-all, 64 percent of all skills have current applications and an additional 24 percent have future applications, with a residual of 12 percent which do not have current or future applications.

In summary, the following conclusions were reached in regard to the four areas of instruction provided through the project:

1. Supervisory Skills training had the best over-all match between the skills anticipated and mastered, - with immediate and future applications of these skills. But 26 percent of the supervisors and participants who had anticipated that the training would allow participants to master specific skills did not feel that they had been mastered.

It is interesting to note, however, that trainees did not initially appreciate the value of the course. There were difficulties during the training in Miami with some participants feeling this training was not at all appropriate. The course was also rated quite low by participants shortly after their return to Honduras when AID and CADERH met with the project's participants.

But the August interviews with trainees and supervisors indicate that the value of this component of instruction became more evident as the participants began to apply what they had learned. This may suggest a weakness in the initial preparation of trainees and the motivation provided by the instructor. None the less, the "fit" between anticipations, skills mastered, and their application is higher than for any other instructional component in the project.

2. 82 percent of the training expectations of participants and their supervisors were met in Electronics. Improved scores on the electronics post-test also indicate that significant learning took place in this instructional component of the project.

Nearly 30 percent of the skills mastered, however, have no present or future applications. This suggests that needs assessments may not have been in harmony with Honduran industrial realities in electrical/electronics.

3. Mechanics training experienced difficulties because of a need to change tutors and failing to complete the program's curricular outline. As a consequence, 66 percent of the training expectations of participants and supervisors were not met. Training expectations were not reached in the areas of heat treatment, tempering, and computerized machining equipment -- even though they had been anticipated in the curriculum. Also, submerged arc welding was anticipated by one of the participants but was not mastered. Other unanticipated skills, however, were mastered.

Tables 3 and 7 also suggest that the fit between the skills mastered, skill improvements, and the applications of these skills was better than for electronics but still there is a residual of 16 percent which have no present or future applications.

4. Pedagogical training was one of the weaker areas of instruction. While 75 percent of the anticipated skills were mastered and all of the skills mastered are being applied according to Table 9, Table 8 shows that only 63 percent of the significant improvements noted in pedagogical skills are being applied.

The Multiplier Effect

The project had anticipated that a multiplier effect of the training would be achieved through each participant teaching his co-workers and/or students what he had learned through the project. The multiplier effect is being achieved by the participants from training centers through their instruction of students.

Industrial participants said that 3 courses had been conducted since their return to Honduras in December of 1983. No instruction was being conducted at the time of the interviews (August 1984). A total of 10 courses are being

Planned for the future by industrial participants, and 6 supervisors said they were involved in planning a future course.

The interviews also revealed that 6 of the participants (25%) had no plans of providing any training for co-workers when they returned to Honduras, and 5 (20%) had no specific plans to do anything in this area in the future. Similarly, 2 supervisors (12%) admitted that they hadn't planned on doing any training when their employees returned from Honduras and 1 said that he was not planning on anything for the future either.

In contrast, there appears to be more of a multiplier effect being achieved with INFOP and other training center participants. Most of these participants are including parts of what they learned in the classes they normally teach. A specific course in gear fabrication was being conducted by INFOP when the interviews were conducted. New courses were also being planned by INFOP and other training centers in heavy equipment repair, gear fabrication, measurement systems, and a skill up-grading course for adult mechanics. But no courses are anticipated for the co-workers of the training centers' participants.

Suggestions for Improving Programs Similar to the Miami Dade Training Program

Table 10 summarizes the suggestions of participants and supervisors for improving courses similar to that of the Miami Dade training program. These suggestions were not selected from a list of alternatives but were open ended questions which solicited specific comments from the participants and supervisors. As a consequence, suggestions which were mentioned several times in the following table should be considered to be particularly important.

The table reveals a significant number of suggestions which are related to the applicability of the instruction for Honduras and for meeting individual training needs (Items 3-9).

Table 10

Suggestions	Part.	Supervisors	Total
(1) Select Participants with Similar Training Needs	6	2	8
(2) More Care in Selection of Partic.	4	2	6
(3) Better Planning of Courses	7	1	8
(4) More Practice & Less Theory	5	2	7
(5) More in Harmony with Honduran Needs	-	3	3
(6) Separate Electricity & Electronics	-	1	1
(7) A Specific Course in Industrial Safety	-	1	1
(8) More Individualized Instruction	2	-	2
(9) More Flexible Curricula	2	-	2
(10) Offer the Course in Honduras	4	3	7
(11) More & Better Equipment for Training	4	-	4
(12) More Competent & Prepared Instructors	3	-	3
(13) Provide all Instruction in Spanish	-	1	1
(14) Follow the Planned Course Outlines	1	1	2
(15) Larger Economic Allowances for Part.	3	1	4
(16) Offer a Longer Course	5	-	5

Concern was also expressed on the selection of trainees, hoping for a group with similar training needs and learning capabilities (1 and 2). This also suggests that the individualization of instruction was not achieved and that with a traditional, locked-step instructional strategy many participants felt that the only alternative for improving instruction would be in selecting participants with more similar learning needs and educational backgrounds. It is evident that more attention should be given to needs assessments and the individualization of instruction (two areas which were also mentioned in the Miami Dade Final Report).

It is significant to note that 4 participants and 3 supervisors thought that in the future it would be better to provide this type of instruction in Honduras (Item 10).

It also appears that some participants were not satisfied with the quality and availability of equipment, or the qualifications and preparation of instructors (11-12).

The remaining suggestions made by participants and supervisors reflect problems with the mechanics curricula, an instructor who did not speak Spanish, a \$25 a week expense allowance for participants which was considered to be very low, and a desire for longer training programs.

CONCLUSIONS

Positive Results of the Project

Among the more positive results of the project, Miami Dade Community College deserves credit for the following:

1. The instruction provided in most areas met the majority of the expectations of the trainees and supervisors (see Tables 2,3,5,7, and 9); and significant improvements in skills were noted by trainees and supervisors as a result of the training received (see Tables 4,6, and 8).
2. Miami Dade Community College performed well in helping trainees gain a better understanding of U.S. life styles, seeing Florida, meeting people, and facilitating communications with trainee's families in Honduras. These factors contributed to a positive training atmosphere for the participants.
3. The logistics and coordination by the Project Director, Tom Halloran, were very good; the instructors in the areas of supervisory skills and electronics were evaluated quite highly by the project's participants and it is evident that significant learning took place in these instructional components of the project.

Areas of Concern

Selection of Participants

No small businesses and only a limited number of medium sized businesses were able to respond to this project by nominating candidates for training. 14 (88%) of the Project's 16 private sector participants were employees of large companies in Honduras (100 employees or more). The average size of the participants' firm was over 900 employees while there are only 204 firms in Honduras with over 100 employees. Further, 7 (44%) of the private sector participants were employed by transnational companies and over one third were from industries run by the same transnational corporation.

It seems that small and medium size establishments found it difficult to get along with out their key maintenance or production personnel for a period as long as three months. Similarly, paying salaries to employees while they are studying and not contributing to the productivity of the firm can be difficult for smaller establishments.

It should be questioned whether USAID should be funding training for large industries and transnationals when many of these companies can often afford to finance these activities on their own. While this problem was mentioned in an issues paper prepared for discussion prior to the funding of the project, it does not appear that it was considered to be pertinent.

Training Costs

In evaluating the training experience at Miami Dade Community College, concern must also be expressed over the cost of this project (\$251,751.77) -- about \$10,500 per participant for three months of training, with participant hour of instruction of costs of \$17.50.

One cannot help but compare these costs with other established training programs which emphasize open entry-exit and more individualized vocational training in the U.S. (\$1.30 to \$6 per participant hour of instruction and \$2.10 for INFOP in Honduras, as compared to \$17.50 for this particular project). And about \$12,000 for a full year of study, including room and board, in technical universities, community colleges, and other established vocational training centers run by public institutions and private companies (RCA and ITT).

Instructional Technologies and Strategies

The lack of pre-tests and post-tests in mechanics and pedagogy makes it difficult to evaluate the learning which took place. During the interviews, several participants mentioned their surprise in seeing instructional technologies being used which were so similar to those used in Honduras. Competency based instruction was not introduced, nor were individualized, open-entry/open-exit training strategies -- which are major innovations in vocational instruction, with the U.S. being recognized as a leader in this area. It is also apparent that the pedagogical skills training was very traditional and local Honduran institutions (INFOP or the MOE) could have provided similar courses in Honduras.

The weakness of instructional stategies was also reflected in the needs assessments and the instruction provided in technical areas. Skills evaluations conducted by Miami Dade in Honduras did not reflect the trainees actual skill levels, training expectations were not met in mechanics, and both technical areas included a significant number of skills which supervisors and trainees feel were not relevant or applicable in Honduras (26% -- see Table 9).

Many of these weaknesses could have been over-come through the use of more individualized, multi-media, and open entry-exit training strategies. It is unfortunate that trainees were not exposed to these state-of-the-art instructional strategies -- particularly since AID/Honduras and CADERH are interested in adapting these types of instructional innovations for future applications in Honduras.

Participants also mentioned that they were surprised to see that U.S. industrial technologies were so similar to those used in Honduras. They were not as sophisticated or as advanced as they had anticipated. Several trainees noted that they had higher expectations and had thought that they would receive more instruction in computerized machining systems and robotics applications.

While it can be questioned whether these technologies have applicability in Honduras, and the project sought to emphasize industrial technologies similar to those found in Honduras, there are possible applications for these technologies in Honduras. Computerized machining equipment, for example, could be used for fabricating intricate, precision replacement parts for local industry, construction equipment, and transportation vehicles. This application could reduce

needs for stocking large numbers of relatively expensive replacement parts and avert production losses when parts are not available.

The training could have provided more information for those who were interested in more sophisticated industrial technologies and allowed Hondurans to gain a better understanding of the possible applications of these technologies. Again, more individualized instruction could have allowed for a wider variety of topics in technical areas and following the established curriculum in mechanics could have provided more instruction in this area.

To be fair, however, it should be mentioned that the Miami Dade Final Report explained that they had backed away from individualization and more innovative curricular strategies because they noted the lack of use of audio-visual, individualized, and multi-media instruction in INFOP and other training institutions. Another factor which may have caused the needs assessment and curriculum development phases of the project to be less effective than anticipated, could have been the accelerated work schedule which was followed in order to complete the training of participants in early December of 1983. The Miami Dade Community College Final Report also called attention to these time limitations.

But it appears that Miami Dade Community College did not possess a great deal of experience in individualized, open entry-exit training strategies, or gearing instruction to the different learning needs and capabilities of individuals. Moreover, at least one of the project's instructors was reported to have been openly opposed to the individualization of instruction and much preferred the traditional, locked-step approach which he was accustomed to using with his other classes in the Dade County Public School System.

Traditional vocational educational philosophies were also expressed in Miami Dade's Final Report which called for grouping trainees by educational levels for future programs of this type. The recommendations/conclusions section of the Final Report also mentioned that a lack of sufficient individualization was the major weakness of the project.

While the RFP (request for proposals) favored institutions which offered individualized, competency based instruction, it was difficult to evaluate U.S. training centers' capabilities without first visiting these institutions and actually seeing the extent to which the educational strategies desired were being practiced.

In retrospect, one can call attention to the problems caused by a lack of individualization and express concern over how this has limited the effectiveness of the project, but catching these problems during the contracting, needs assessments, and curriculum development phases of the project would have been difficult given the circumstances. And when it did become evident that sufficient individualization was not being provided, instruction had already begun and it was not possible to reorganize the courses for meeting the project's expectations.

Multiplier Effect

A major concern for the project is that the multiplier effect has not been realized by private sector participants. The interviews also revealed that some supervisors never intended to provide instruction which would allow for the multiplier effect.

This calls the process for the selection of participants into question. It also raises questions in regard to the extent to which Miami Dade Community College was directing instruction towards further applications in Honduras, and the degree to which projects of this type can expect supervisors and participants to carry through on their commitments once that the initial training of participants has been completed.

Instructional Modules Prepared for Use in Honduras

Supervisory and pedagogical skill training modules were not developed for use in Honduras. Apparently it was not anticipated that supervisory and pedagogical skills were to be taught to others once that participants returned to Honduras. Mechanics modules were outlined but focussed only on lathe and milling machine operation, measurements, sharpening cutting tools, and technical calculations. Participants were instructed to prepare their own "rough and ready" modules as needs would arise for instructing their co-workers.

The electronics modules prepared for trainees in Miami was quite complete and met virtually all of the participants and their supervisors' training expectations. But there are questions as to the applicability of portions of these modules, and simply revising these modules for their replication in Honduras will not be sufficient for assuring that local training needs will be met.

The electronics modules which participants have prepared do not reflect sound curricular development strategies. Educational objectives are vague and practical learning exercises are limited. Moreover, an evaluation of these modules, conducted by an independent contractor with work experience in industrial electronics and instruction, in both the U.S. and Honduras (Allan Greenberg), suggests that these modules would not be appropriate for providing training for Honduran workers because of an excessive emphasis on theory in some areas. The evaluation also concluded that some of the instruction would not be required for the type of industrial electronic technician which Honduran industry seeks to employ, and would limit instruction to a relatively small and elite group of well educated employees.

The problems associated with the modules prepared for use in Honduras are reflected in project participants focussing the limited training they are conducting on replicating the learning activities from Miami Dade, rather than emphasizing local needs analyses for determining specific training needs and focussing on more specific instructional objectives which should be mastered by co-workers.

LESSONS LEARNED FOR FUTURE TRAINING PROGRAMS

Based on this Impact Evaluation, the following suggestions are being made for future training programs of this type.

1. AID missions, local industry, and training institutions should consider the possibilities of using host country instructors and training facilities for skill up-grading of higher level technical employees, bringing the equipment, educational materials, and more specialized instructors in from other nations as necessary. This could be more cost-effective and allow larger enrollments.

2. If it can be shown that there is a high demand in Latin America for the types of training which were called for in this project, if participant hour of instruction costs can be significantly reduced, and if there is a marked preference for providing training of this type in the U.S.; then AID/Washington might consider contracting a public or private institution to provide this training on an ongoing basis in a

geographical area of the U.S. where Spanish language skills are present.

A third alternative worthy of consideration would be in establishing an "AID training institution," where state-of-the-art pedagogical training, line supervisor skills, and specific, high level technical training could be provided for all AID missions in Latin America. This could allow significant savings as economies of scale are realized and with more direct controls over curricular strategies and course contents for assuring that individualized training needs are met.

3. The results of the project suggest that more individualized, open entry-exit training programs would be more appropriate for meeting the varied skill up-grading needs of Honduran technicians and their respective employers.

4. When institutions are contracted for providing this type of training or related technical assistance in vocational training programs, an on-site visit should be made to determine the capabilities and appropriateness of the institution before a contract should be signed. This would help assure that institutions have the experience and the capabilities required for meeting the expectations of trainees.

5. Small and medium size businesses and industries often find it difficult to participate in full time training programs of this type. They do not have enough employees for allowing them to spare key personnel for a period of three months. Nor do they have sufficient levels of productivity to pay salaries to employees while they are studying.

Small businessness also find it more difficult to sponsor in-plant training because they do not have enough employees for realizing economies of scale. Taking a few key people off of production lines can result in significant sacrifices in productivity and it is difficult to use a smaller industry's productive facilities for instruction during working hours.

In many cases it will be more practical and cost-effective to train employees from smaller firms in institutions like INFOP where much greater economies of scale can be realized by bringing employees from various smaller businesses

together for meeting specific training needs. This suggests that it may have been incorrect to assume that a multiplier effect could be achieved through in-plant training in smaller businesses, or that smaller businesses would have been able to participate in the project. The strategies used in this project appear to be more appropriate for larger businesses and training centers.

But the question remains whether USAID should be using its limited funds for financing the training of larger businesses and transnationals when most of these establishments already have human resource development programs which they are financing on their own.

6. The project design and the activities of Miami Dade Community College did not assure a multiplier effect for the project. More attention must be given to this area in the future -- perhaps, by requiring that the participating industries and training centers repay the full cost of training their participants if the institution does not achieve a multiplier effect within a specified time after the initial training of participants has been completed.

In any case, if a multiplier effect is to be achieved, USAID/Honduras and CADERH should prepare plans for follow-up activities. These plans should include additional instructor training for allowing industrial participants to teach on a part-time basis in INFOP and increase the effectiveness of the in-plant training programs of others.

Efforts must also be made for providing proper equipment, curricular and shop materials. Some measure of quality control must be established for assuring that instruction will meet the training needs of local industry and individual participants. It should be noted that simply repeating the modules which were offered in Miami could not be expected to meet the specific skill up-grading needs of many participants or their employers in Honduras (a significant number of the technical skills mastered by the project participants do not have current applications in Honduran industry or training centers -- see Table 9).

APPENDIX I

CTBS (McGraw-Hill) Pre-Tests and Post-Tests used for Miami Dade
Community College Participants

PRUEBA 1

VOCABULARIO DE LECTURA

Instrucciones:

Esta prueba mostrará lo bien que sabes el significado de las palabras.

Cada ejercicio tiene una frase con una palabra subrayada y cuatro respuestas para escoger. Las cuatro respuestas van bien con la frase, pero sólo una de las respuestas significa lo mismo, o casi lo mismo, que la palabra que está subrayada.

Fíjate en la palabra que está subrayada. Después lee las palabras que están debajo. Escoge la palabra que signifique lo mismo, o casi lo mismo, que la palabra que está subrayada. Llena el espacio en tu hoja de respuestas que tenga el mismo número que la respuesta que hayas escogido.

Ejemplos:

Haz el Ejemplo A que está abajo y marca la respuesta en tu hoja de respuestas.

A casa amplia

- 1 grande
- 2 larga
- 3 nueva
- 4 lista

Debiste haber llenado el espacio 1 en tu hoja de respuestas, porque grande quiere decir casi lo mismo que amplia.

Ahora haz el Ejemplo B que está abajo y marca la respuesta en tu hoja de respuestas.

B recibir una carta

- 5 creer
- 6 obtener
- 7 leer
- 8 querer

Debiste haber llenado el espacio 6 en tu hoja de respuestas, porque obtener quiere decir casi lo mismo que recibir.

1	<u>libro excelente</u>	6	<u>elegir un regalo</u>	11	<u>oportunidad de viajar</u>
1	caro	5	aceptar	1	ocasión
2	nuevo	6	escoger	2	puerta
3	sobresaliente	7	agarrar	3	regalo
4	extraño	8	ofrecer	4	tratar
2	<u>apresurarse a casa</u>	7	<u>retrasado con su tarea</u>	12	<u>molestó a su hermano</u>
5	bailar	1	ansioso	5	acompañó
6	apurarse	2	tarde	6	le pegó
7	mandarse	3	rudo	7	irritó
8	quedarse	4	esperando	8	le dijo
3	<u>acabar la tarea</u>	8	<u>charla breve</u>	13	<u>aventura arriesgada</u>
1	anunciar	5	aburrida	1	valiente
②	completar	6	demorada	2	peligrosa
3	estudiar	7	corta	3	sin fin
4	trabajar	8	inesperada	4	gloriosa
4	<u>miedo terrible</u>	9	<u>donar dinero</u>	14	<u>información requerida</u>
5	gusto	1	contribuir	5	completa
6	brinco	2	hacer	6	necesaria
7	ruido	3	ahorrar	7	producida
⑧	susto	4	sacar	8	rehusada
5	<u>poseedor de propiedad</u>	10	<u>estilo actual</u>	15	<u>un hombre responsable</u>
1	intención	5	viejo	1	justo
2	pérdida	6	moderno	2	razonable
③	dueño	7	bonito	3	sensible
4	venta	8	raro	4	de confianza

16	un regalo <u>caro</u>	21	tiempo <u>extendido</u>	26	<u>habilidad</u> especial
5	costoso	1	desarrollado	5	ejecución
6	bonito	2	expresado	6	atracción
7	grande	3	alargado	7	destreza
8	inesperado	4	necesario	8	espíritu
17	libertad <u>restringida</u>	22	<u>mirada</u> confusa	27	<u>merecer</u> un aumento
1	lanzada	5	preferencia	1	permitirse
2	limitada	6	expresión	2	ganarse
3	respetada	7	frase	3	esperar
4	restaurada	8	riña	4	planear
18	arbusto grande	23	periodista <u>viajero</u>	28	<u>incidente</u> importante
5	mata	1	confuso	5	evento
6	hoja	2	libre	6	evidencia
7	semilla	3	errante	7	pensamiento
8	vegetal	4	cansado	8	viaje
19	camino <u>torcido</u>	24	pregunta <u>lógica</u>	29	<u>abundante</u> existencia de comida
1	cubierto	5	ilegal	1	pesada
2	peligroso	6	indispensable	2	noble
3	largo	7	ofensiva	3	muchía
4	sinuoso	8	razonable	4	protegida
20	<u>tensión</u> pesada	25	<u>conducta</u> apropiada	30	<u>iniciar</u> el experimento
5	presión	1	selección	5	empezar
6	restrictión	2	reacción	6	continuar
7	cuerda	3	conciencia	7	oponer
8	borrasca	4	decisión	8	probar

31 logró reconocimiento

- 1 vio
- 2 dio
- 3 quiso
- 4 ganó

32 grito penetrante

- 5 humorístico
- 6 ahogado
- 7 musical
- 8 agudo

33 declaración de guerra

- 1 acción
- 2 aviso
- 3 poderío
- 4 daño

34 más allá de la línea del cielo

- 5 del arco iris
- 6 de la vista
- 7 del horizonte
- 8 del panorama

35 lo persuadió

- 1 aconsejó
- 2 acercó
- 3 convenció
- 4 informó

36 naturaleza tenaz

- 5 dudosa
- 6 alegre
- 7 testaruda
- 8 mala

37 ocupación interesante

- 1 empleo
- 2 examen
- 3 ocasión
- 4 suceso

38 intento vano

- 5 conjunto
- 6 principal
- 7 inútil
- 8 valioso

39 informe oral

- 1 ventaja
- 2 banco
- 3 idea
- 4 reporte

40 llegada puntual

- 5 temprana
- 6 preparada
- 7 a tiempo
- 8 inesperada

PRUEBA 2

COMPRENSION DE LECTURA

Instrucciones:

Esta prueba mostrará lo bien que entiendes lo que lees.

Lee cada narración. Luego haz los ejercicios que siguen. Escoge la mejor respuesta para cada ejercicio. Luego llena el espacio en la hoja de respuestas que tenga el mismo número que la respuesta que hayas escogido.

Ejemplo:

Lee el siguiente párrafo. Luego haz el Ejemplo A y marca la respuesta en tu hoja de respuestas.

Ayer en la mañana Tomás se fue en su bicicleta a la escuela. Al ir por las calles lo pasaban muchos carros y autobuses. El tuvo mucho cuidado de observar las leyes de tránsito. Se paró en la esquina y después señaló en que dirección iba a doblar.

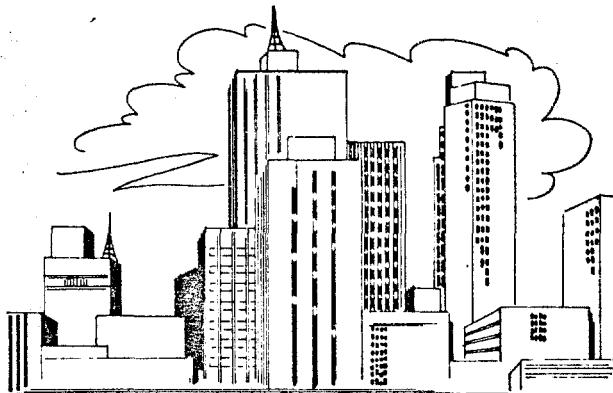
A ¿Qué observó Tomás con cuidado?

- 1 carros
- 2 autobuses
- 3 leyes de tránsito
- 4 la esquina de la calle

Debiste haber llenado el espacio 3 en tu hoja de respuestas, porque la narración dice que Tomás observó las leyes de tránsito.

- 1 ¿Se cansan a veces los rascacielos
- 2 De mantenerse erguidos muy altos?
- 3 ¿Tiritan a veces en noches de frío
- 4 Con sus cumbres contra el cielo?

- 5 ¿Se sienten a veces solitarios
- 6 Porque han crecido tan altos?
- 7 ¿Desean a veces poder acostarse
- 8 Y nunca más levantarse?



1 El poeta se pregunta si los rascacielos se cansan de

- 1 crecer tan altos
- 2 tiritar en la noche
- 3 mantenerse erguidos
- 4 acostarse y no levantarse

2 Este poema trata principalmente de

- 5 cómo se sienten los rascacielos
- 6 qué son los rascacielos
- 7 por qué los rascacielos son altos
- 8 dónde encontrar rascacielos

3 En el poema, el autor usa la palabra levantarse en la línea 8 para que rime con

- 1 despertarse
- 2 acostarse
- 3 lavarse
- 4 solitarios

4 El poeta escribió acerca de los rascacielos

- 5 mencionando hechos
- 6 contando un cuento
- 7 haciendo preguntas
- 8 dando su opinión

5 El poeta quiere que creas que los rascacielos tienen

- 1 sentimientos humanos
- 2 personas que los visiten
- 3 mucha gente que trabaja en ellos
- 4 muchos pisos y ventanas

Gran parte de nuestro país está tristemente arruinada por la imprudente manera de talar los bosques. Cortar los árboles de un bosque sin reponerlos con plantas de semillero destruye la belleza de la tierra y causa muchos otros daños.

Después de que una área ha sido cortada y dejada completamente desnuda, generalmente el suelo comienza a deslavarse. Tal erosión empieza una cadena de destrucción.

El lodo baja por las laderas y llena los arroyos. Este lodo cubre la grava de los lechos de cría, en donde el salmón deposita sus huevos. Esto causa que se mueran mucho salmones. La pérdida de un pez tan importante afecta grandemente a toda la industria pesquera. Otros seres que dependen de los ríos y arroyos pueden igualmente ser afectados por la erosión de la tierra.

6 A cortar los bosques se afecta

- 5 el tamaño de la tierra
- 6 las carreteras de la tierra
- 7 la belleza de la tierra
- 8 la ubicación de la tierra

7 En esta narración, ¿qué quiere decir la palabra erosión?

- 1 sembrar árboles pequeños
- 2 un método de cortar los árboles
- 3 un deslave de la tierra
- 4 una manera de criar salmón

8 De acuerdo con esta narración, cuando se cortan los árboles, éstos deben

- 5 reemplazarse
- 6 dejarse que se sequen
- 7 dejarse en el bosque
- 8 usarse para hacer represas en los arroyos

9 En esta narración, ¿qué quiere decir planta de semillero?

- 1 un pescado
- 2 suelo con plantas
- 3 un árbol joven
- 4 un pedazo de grava

10 ¿Cuál es usualmente la causa de la erosión?

- 5 grava
- 6 tierra sin árboles
- 7 demasiado suelo
- 8 aumento de la pesca

11 De acuerdo con esta narración, ¿por qué se mueren muchos salmones?

- 1 Se secan los arroyos.
- 2 Cunden las enfermedades.
- 3 Los pescadores pescan peces muy chicos.
- 4 El lodo destruye los lechos de cría.

12 ¿De qué trata principalmente esta narración?

- 5 de la belleza de la tierra
- 6 de la necesidad de reponer las plantas de semillero
- 7 del daño causado por la erosión
- 8 de cómo se llenan de lodo todos los arroyos

La semana pasó muy rápido. Felipe se fijó en el campo sembrado de altos pastos moviéndose al viento. Le hizo recordar a gente parada en un autobús moviéndose de un lado a otro mientras que cambiaba el autobús. Le sorprendió encontrarse pensando en la ciudad.

La semana de acampar al aire libre lo había cambiado, despertando sus sentidos a nuevos sonidos, paisajes, y olores. Era el cielo de noche, sin embargo, lo que mejor recordaría. Millones de estrellas. Le asombraba que el cielo estuviera tan lleno de estrellas todas las noches. Uno de los muchachos mayores le había señalado algunas de las constelaciones y le dijo cómo, siglos atrás, la gente las usaba para guiarse en sus viajes. En la ciudad ni siquiera se podían ver las estrellas, menos usarlas como guía.

El ruido de la bocina de un carro le lastimó el oído como si fuera una piedra. Felipe caminó hacia el autobús que esperaba y se subió en él. Se sintió deprimido durante la mayor parte del viaje. Estaba

ya oscuro cuando el autobús finalmente se salió del camino de dos pistas y tomó la carretera hacia la ciudad. Al dar la vuelta, Felipe sintió que el corazón le latía más aprisa. ¿Podría ser que realmente se sintiera contento de estar de regreso en la ciudad?

Vio los enormes edificios aparecer más adelante. Estos habían tapado el cielo y la luz de las estrellas como si fueran persianas que se habían cerrado y se hubieran prendido lámparas. —Pero este es mi sitio,—pensó Felipe. —Este soy yo. Yo conozco estas calles, estos edificios y ruidos. Yo conozco estas luces brillantes. Se siente bien haber regresado. Es como estar en tu propia casa descansando con los pies levantados, no en algún lugar en donde tienes que preocuparte por tus modales.

Al caminar el autobús despacio a través del tráfico de la ciudad, Felipe se sonrió consigo mismo.

13 ¿Qué es lo que recordará mejor Felipe acerca del campamento?

- ① el cielo de noche
- 2 los pastos al viento
- 3 los árboles después de la lluvia
- 4 el sol de la mañana

14 ¿Qué le recordó a Felipe la gente parada en el autobús?

- ⑤ el pasto que se movía
- 6 la corriente de agua
- 7 las estrellas brillantes
- 8 el campamento lleno

15 ¿Qué le lastimó el oído a Felipe?

- 1 una piedra 2 una mano
- ③ un ruido 4 una rama

16 ¿A qué hora llegó el autobús de regreso a la ciudad?

- 5 a mediodía
- ⑥ en la noche
- 7 en la mañana
- 8 en la tarde

17 ¿Qué le pasó a Felipe durante el tiempo que estuvo fuera de la ciudad?

- 1 Extrañó su casa.
- 2 Se molestó.
- 3 Aprendió a ser chistoso.
- ④ Aprendió muchas cosas nuevas.

18 El autor usa las palabras como si fueran persianas que se habían cerrado y se hubieran prendido lámparas para describir cómo

- 5 los edificios tapaban el cielo
- ⑥ salieron las estrellas en la noche
- 7 se cerraron las puertas del autobús
- 8 se alumbraba con velas un cuarto oscuro

19 ¿Cuál de estas palabras describe mejor a Felipe al final del cuento?

- 1 enojado
- ② contento
- 3 asombrado
- 4 preocupado

El abulón es un enorme caracol al cual se le llama algunas veces oreja marina porque su única concha parece una oreja gigante. Los abulones se encuentran en las costas del Japón, China, y la parte oeste de los Estados Unidos.

La concha de afuera del abulón es áspera y a menudo está cubierta de escaramujos, pero la parte de adentro es de suave concha nácar. Brilla con suaves colores que hacen que uno se acuerde de los colores del arco iris.

En la noche, el abulón se arrastra en el fondo del mar y se alimenta de lechuga marina. Durante el día, se prende a una roca, agarrándose fuertemente con su poderosa pata.

Esta pata, un músculo grande, es la parte principal del molusco, y cuando la presiona contra una roca, se pega como una copa de succión. Aun un pulpo con sus ocho tentáculos no puede desprenderse al abulón.

La carne del abulón es deliciosa cuando se prepara bien. A los japoneses y a los chinos les gusta la carne del abulón seca y ahumada.

Las conchas del abulón nos dan hermosos productos tales como botones, hebillas, y mangos de cuchillos.

20 El abulón es

- (5) un molusco.
- 6 una roca marina
- 7 una planta marina
- 8 un pulpo

21 El abulón usa su músculo grande para

- 1 atrapar peces
- 2 nadar rápido
- (3) pegarse a las rocas
- 4 digerir su comida

22 ¿Qué come el abulón?

- 5 peces chicos
- (6) plantas marinas
- 7 insectos marinos
- 8 ostras pequeñas

23 La parte de adentro de la concha del abulón es

- 1 áspera y gris opaca
- 2 áspera y café
- 3 suave y gris claro
- (4) suave y de muchos colores

24 ¿Cuál de los siguientes es el mejor título para este artículo?

- 5 La oreja marina gigante
- 6 La concha del caracol marino
- 7 El abulón como comida
- 8 El músculo fuerte del abulón

25 ¿En qué orden se dan estos datos acerca del abulón?

- 1 sus usos, su comida, su músculo grande, su apariencia
- 2 su músculo grande, su apariencia, sus usos, su comida
- (3) su apariencia, su comida, su músculo grande, sus usos
- 4 su comida, su músculo grande, su apariencia, sus usos

Se bajó torpemente del último escalón hacia el mundo del mañana. El corazón le latía fuertemente. ¿Qué paso mayor había dado alguna vez el hombre? Sus palabras, haciendo eco a sus pensamientos, salieron claramente de millones de anunciantes de televisión de todo el mundo. «¡Este es un paso pequeño para el hombre, un salto gigante para la humanidad!» Verdaderamente, el mundo entero no respiró mientras que Neil Alden Armstrong se convertía en el primer hombre que pusiera pie en la luna. -

El hizo una pausa y se acordó del jovencito que recibió su licencia de piloto al cumplir los dieciseis años, antes aun de recibir su licencia de manejar. Se acordó de la guerra Coreana y de las setenta y ocho misiones que había volado para la Marina de los Estados Unidos. Entonces se acordó de su entrenamiento en ingeniería aeronáutica y de los aviones de prueba que había volado, incluyendo el avión cohete X-15.

Otros recuerdos le pasaron por la mente: haber sido el primer astronauta civil y haber llevado a cabo el primer acoplamiento de dos vehículos espaciales en órbita. Ahora él era el primer ser humano en pisar la luna. Parpadeó y se fijó en el raro paisaje delante de él. Era hora de dar el siguiente paso.

26 ¿Qué edad tenía Armstrong cuando le dieron su licencia de piloto?

- 5 15 años
- 6 16 años
- 7 21 años
- 8 30 años

27 ¿Qué palabras de la narración nos dicen que Armstrong creyó que el viaje a la luna era importante?

- 1 El corazón le latía fuertemente.
- 2 ... un salto gigante para la humanidad!
- 3 Era hora de dar el siguiente paso.
- 4 ... el raro paisaje delante de él.

28 ¿Qué quiere decir que pusiera pie en?

- 5 habitar
- 6 caminar en
- 7 conquistar
- 8 medir

29 ¿Cuál de las siguientes cosas hizo Armstrong primero en su vida?

- 1 volar el X-15
- 2 llegar a la luna
- 3 convertirse en el primer astronauta civil
- 4 volar los aviones de la Marina en la guerra Coreana

30 ¿Cuál de las siguientes palabras describe mejor la carrera de astronauta de Armstrong?

- 5 larga
- 6 imprudente
- 7 cuidadosa
- 8 arriesgada

31 ¿Por qué dice el autor que la luna es el mundo del mañana?

- 1 La tierra está excesivamente poblada.
- 2 El es un escritor de fantasía científica.
- 3 Armstrong llega a la luna al día siguiente.
- 4 La luna representa una nueva frontera que explorar.

32 ¿Qué emoción sintió Armstrong cuando pisó la luna?

- 5 alarma
- 6 preocupación
- 7 sorpresa
- 8 respeto

- A Cuando y era un niño en la granja de mi abuelo, en el estado de Kansas, el trigo se trillaba usando herramientas sencillas y no se conocían las máquinas que se usan hoy en día.
- B Cuando traían el trigo de los campos, el duro piso de arcilla del trilladero se barría hasta quedar completamente limpio. Dos bueyes eran enganchados a un rodillo de piedra muy pesado. Cuando los bueyes jalaban, el rodillo daba vueltas en círculo, presionando fuertemente el trigo contra el suelo hasta arrancar las semillas de los tallos y desprender la cáscara. (La cáscara es aquello que cubre la semilla. Cuando se desprende de la semilla se le llama broza.) Entonces nosotros recogíamos los manojo de paja tirados sobre el suelo usando rastrillos caseros hechos de ramas de árbol, las que eran cortadas en forma de tenedores con varias puntas más o menos afiladas. Sacudíamos la paja fuertemente hasta que salieran todas las semillas del trigo.
- C Después levantábamos toda la paja del suelo del trilladero, dejando seis centímetros de semillas de trigo y broza. El procedimiento final de separar las semillas del trigo y la broza se hacía usando escobas hechas en casa. En la punta de un palo de dos metros, mi abuelo había amarrado un manojo circular de ramas cortadas parejamente en la parte de abajo. Nosotros barríamos todo el trigo y hacíamos varios montones grandes. No hacía muchos años atrás que los trilladores alzaban los manojo de trigo de estos montones y los aventaban al aire. El aire hacía volar la broza y las semillas de trigo caían al piso del trilladero. Pero mi abuelo había inventado una pequeña carretilla que tenía una manija y una rueda con paletas como de ventilador que producía un chiflón de aire cuando uno la hacía dar vueltas. Yo hacía dar vueltas a la manija, mientras que los hombres, usando palas, aventaban el trigo y la broza en frente de la rueda de la carretilla. La broza volaba fuera del piso del trilladero y el trigo caía dentro de una canasta.
- D Cuando la canasta estaba llena, las semillas se vaciaban en sacos. Al fin del día, todos los sacos de trigo eran atados fuertemente, cargados en una carretilla y estaban listos para el mercado.

33 ¿Cómo era el piso del trilladero?

- 1 duro y limpio
- 2 suave y polvoriento
- 3 cubierto de pasto
- 4 cubierto de malas hierbas

34 Después de que se ponía el trigo en sacos, se

- 5 molía en harina
- 6 vendía en el mercado
- 7 guardaba para darle de comer a las vacas
- 8 guardaba para sembrarlo al año siguiente

35 ¿En qué párrafo se describe el procedimiento final de separar las semillas de trigo de la broza?

- | | |
|-----|-----|
| 1 A | 2 B |
| 3 C | 4 D |

36 ¿De qué estaban hechos los rastrillo?

- 5 únicamente de hierro
- 6 únicamente de madera
- 7 de hierro y acero
- 8 de hierro y madera

37 Las dos maneras de separar la broza de la semilla de trigo, la manera del abuelo y la manera antigua, requerían el uso de

- 1 bueyes
- 2 aire
- 3 rodillos
- 4 palas

38 ¿Cuál de los siguientes es el mejor título para esta narración?

- 5 Cortando trigo
- 6 Sembrando trigo
- 7 Cultivando trigo
- 8 Trillando trigo

39 ¿Qué clase de hombre crees tú que era el abuelo?

- 1 poco amable y flojo
- 2 frugal e ingenioso
- 3 feliz y despreocupado
- 4 difícil de trabajar con él

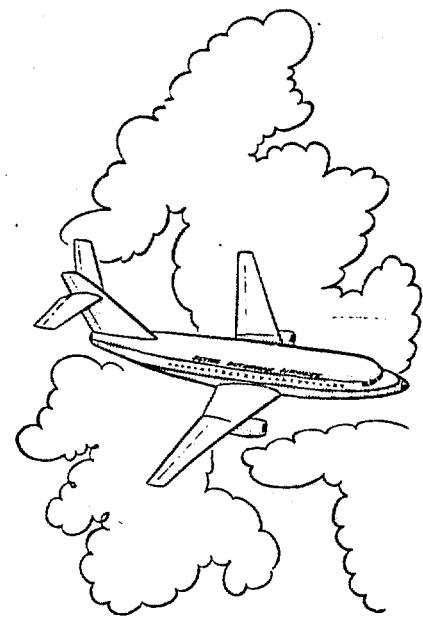
Allá abajo, cubierto por un diseño de copos nubosos, enmarcando un dibujo café-verduzco, se halla un mundo infinitamente pequeño donde todo parece inmóvil.

Hay gente, por supuesto—ellos fueron los que dibujaron los cuadros del tablero—y al principio los vimos esparcidos por los caminos como una hilera de hormigas que han de haber sido automóviles.

Ahora, sin embargo, son invisibles y silenciosos.

Esto es, realmente, lo que nosotros creemos acerca de nuestro pequeño mundo al verlo desde un avión que se balancea en el cielo.

Tratamos de calcular (aunque el capitán ya nos lo había dicho) a cuántas millas por hora estaba volando nuestro jet; no obstante, parecíamos estáticos, parados sin movimiento ni apuro, como parte intrínseca del aire que en forma curiosa es sólido a nuestros pies. Ese mundo que allá abajo espera, se agrandará y crecerá en importancia y tamaño en menos de una hora. Allá volveremos a preocuparnos por la labor de las escuelas, y las clases, y los equipos de deportes, y por escoger zapatos del mismo color, y por lavar el carro que está sucio, y olvidaremos que el cielo es ancho e inmenso y que la tierra es pequeña.



40 ¿Qué era lo que parecía una hilera de hormigas vista desde el avión?

- 5 automóviles en el camino
- 6 copos nubosos
- 7 gente caminando.
- 8 cuadros del tablero

41 Aun cuando los aviones de propulsión viajan muy rápido, el pasajero

- 1 no se puede mover
- 2 siente poco el movimiento
- 3 quiere que vaya más despacio
- 4 ve pasar a otros aviones

42 ¿De qué realidad se da cuenta un pasajero mientras qué está en el mundo pequeño de un avión?

- 5 del color de zapatos y carros
- 6 de la escuela, clases, y deportes
- 7 del cielo ancho y la tierra pequeña
- 8 de problemas de la escuela y de la casa

43 ¿Qué hará la gente del cuento cuando se termine el viaje en avión?

- 1 volverá a subirse al avión
- 2 nunca más hará un viaje en avión
- 3 empezará a pensar en cosas de la vida diaria
- 4 seguirá pensando en el viaje en avión

44 Este cuento trata principalmente de

- 5 lo rápido que vuela un jet
- 6 lo que piensa la gente al ver los aviones
- 7 lo que piensa una persona mientras va volando
- 8 lo bien que se ve desde la ventana del avión

45 El avión parece

- 1 estar haciéndose más grande
- 2 ser parte del aire, sin apuro
- 3 estar viajando a 1,600 kilómetros por hora
- 4 estar apurado por regresar a la tierra

PRUEBA 3

COMPUTACION

DE MATEMATICAS

Esta prueba mostrará lo bien que sabes sumar, restar, multiplicar, y dividir.

Instrucciones:

Haz las operaciones que están en las cuatro páginas siguientes. Haz todas tus cuentas en el papel de práctica. Llena el espacio en tu hoja de respuestas que tenga la misma letra que la respuesta que hayas escogido.

Ejemplo:

Haz el Ejemplo A que está abajo y marca la respuesta en tu hoja de respuestas.

Suma

A	8	A	4
	+ 4	B	6
	<hr/>	C	8
		D	12

Debiste haber llenado el espacio D en tu hoja de respuestas, porque ocho más cuatro son doce.

Haz estas operaciones de suma. Reduce las fracciones a sus formas mínimas.

- 1 A 41
 B 42
 $46 + 5 =$ C 51
 D 411

- 5 A 744
 B 754
 $179 + 430 + 245 =$ C 844
 D 854

- 9 A $16\frac{2}{7}$
 B $16\frac{7}{12}$
 $+ \frac{12\frac{1}{3}}{4\frac{1}{4}}$ C $17\frac{5}{12}$
 D $17\frac{3}{4}$

- 2 E 65
 F 66
 $+ 29$ G 67
 H 76

- 6 E 74,394
 F 74,484
 $36,418 + 4,893 =$ G 74,494
 $25,153 + 8,030$ H 77,494

- 10 E 3.69
 F 36.9
 $+ 30.4$ G 39.6
 H 369.0

- 3 A $11\frac{3}{4}$
 B $13\frac{5}{8}$
 $13 + 2\frac{3}{4} =$ C $15\frac{5}{8}$
 D $15\frac{3}{4}$

- 7 A 745
 B 755
 $346 + 159 =$ C 845
 D 855

- 11 A 47.34
 B 55.24
 $0.64 + 44.56 =$ C 56.64
 D 57.34

- 4 E 16,946
 F 16,956
 $2,713 + 3,574 =$ G 17,046
 $+ 2,020$ H 17,066

- 8 E $\frac{1}{4}$
 F 1
 $\frac{1}{2} + \frac{1}{2} =$ G 2
 H 6

- 12 E \$24.00
 F \$25.75
 $$20.00 + 0.75 =$ G \$26.00
 H \$26.25

Haz estas operaciones de resta. Reduce las fracciones a sus formas mínimas.

13	A	397	17	A	3,278	21	A	$20\frac{2}{3}$
	B	478		B	3,287		B	$22\frac{3}{4}$
	C	488	$\underline{- 4,327}$	C	3,362		C	$23\frac{1}{3}$
	D	498		D	3,478		D	$23\frac{2}{3}$
14	E	230	18	E	4,769	22	E	4.35
	F	260	$6,341 - 457 =$	F	4,884		F	4.46
490 - 130 =	G	360		G	5,769		G	43.5
	H	630		H	5,884		H	44.6
15	A	3,796	19	A	$\frac{1}{7}$	23	A	3.26
	B	3,885		B	$\frac{2}{7}$		B	32.6
$\underline{- 796}$	C	4,796	$\frac{3}{7} - \frac{1}{7} =$	C	$\frac{4}{7}$		C	33.4
	D	4,885		D	2		D	33.6
16	E	543	20	E	0	24	E	\$22.25
	F	553		F	$\frac{1}{2}$		F	\$23.25
$648 - 105 =$	G	743	$\frac{1}{3} - \frac{1}{3} =$	G	1		G	\$24.75
	H	753		H	3		H	\$26.75

Haz estas operaciones de multiplicación. Reduce las fracciones a sus formas mínimas.

25	A	303	29	A	543	33	A	$\frac{1}{16}$
	B	600		B	682		B	$\frac{1}{8}$
$\underline{\times \ 3}$	C	630	$\underline{\times \ 24}$	C	732		C	$\frac{1}{2}$
	D	900		D	972		D	1
26	E	65	30	E	13,212	34	E	63.55
	F	85		F	13,272		F	65.75
$\underline{\times \ 4}$	G	100	$\underline{\times \ 506}$	G	119,922		G	67.05
	H	110		H	120,942		H	67.50
27	A	1,502	31	A	$\frac{10}{13}$	35	A	54.72
	B	1,514		B	$\frac{21}{56}$		B	55.67
$\underline{\times \ 8}$	C	5,248	$\frac{3}{5} \times \frac{7}{8} =$	C	$\frac{21}{40}$		C	60.12
	D	5,648		D	$\frac{3}{4}$		D	601.20
28	E	18,013	32	E	$\frac{1}{16}$	36	E	\$26.60
	F	18,342		F	4		F	\$159.60
$\underline{\times \ 6}$	G	18,432	$8 \times \frac{1}{2} =$	G	6		G	\$169.60
	H	183,042		H	10		H	\$359.60

Haz estas operaciones de división. Reduce las fracciones a sus formas mínimas.

37

$$7 \overline{) 427}$$

- A 33
- B 51
- C 61
- D .82

41

$$6 \overline{) 12,000}$$

- A 120
- B 200
- C 1,200
- D 2,000

45

$$4 \div \frac{1}{2} =$$

- A $\frac{1}{8}$
- B 1
- C 2
- D 8

38

$$28 \div 7 =$$

- E $\frac{1}{4}$
- F $\frac{1}{3}$
- G 3
- H 4

42

$$39 \overline{) 3,370}$$

- E 73 R 23
- F 86 R 16
- G 86 R 36
- H 99 R 9

46

$$\$12.00 \div 4 =$$

- E \$3.00
- F \$3.30
- G \$30.00
- H \$33.00

39

$$5 \overline{) 550}$$

- A 100
- B 110
- C 120
- D 150

43

$$330 \div 5 =$$

- A 9
- B 15
- C 66
- D 71

47

$$\$3.00 \overline{) \$24.00}$$

- A .08
- B .60
- C 7.00
- D 8.00

40

$$9 \overline{) 183}$$

- E 9 R 3
- F 12 R 3
- G 20 R 3
- H 21 R 3

44

$$\frac{1}{5} \div \frac{1}{5} =$$

- E $\frac{1}{25}$
- F $\frac{1}{10}$
- G $\frac{2}{5}$
- H 1

48

$$21 \overline{) 10.08}$$

- E 0.48
- F 4.08
- G 4.80
- H 40.8

PRUEBA 4

CONCEPTOS Y APLICACIONES DE MATEMATICAS

Esta prueba mostrará lo bien que sabes resolver problemas de matemáticas.

Instrucciones:

Lee cada ejercicio y escoge la respuesta que tu creas que esté bien. Haz todas tus cuentas en el papel de práctica. Llena el espacio en tu hoja de respuestas que tenga la misma letra que la respuesta que hayas escogido.

Ejemplo:

Haz el Ejemplo A y marca la respuesta en tu hoja de respuestas.

A ¿Cuál es el número que falta?

8, 10, 12, _____, 16

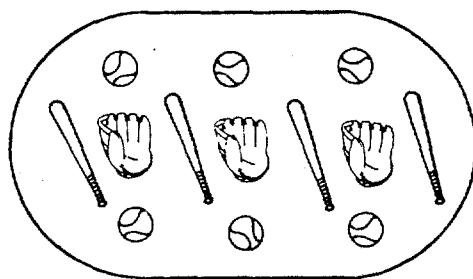
- A 11**
- B 13**
- C 14**
- D 16**

Debiste haber llenado el espacio C en tu hoja de respuestas, porque el número que falta es el 14.

- 1 ¿Cuántos elementos hay en el conjunto R?
 $R = \{2, 4, 6, 8, 10\}$

- A 2
- B 5
- C 8
- D 10

- 2 Fíjate en el conjunto de equipo de béisbol. ¿Qué fracción del conjunto son los bates?

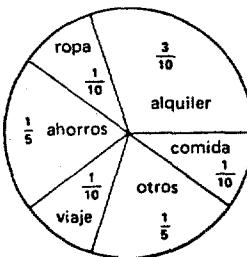


- E $\frac{4}{13}$
- F $\frac{4}{9}$
- G $\frac{6}{13}$
- H $\frac{1}{2}$

- 3 Fíjate en la gráfica de abajo. Muestra como gasta la Sra. Pérez sus ingresos. ¿En qué cosa invierte más dinero la Sra. Pérez?

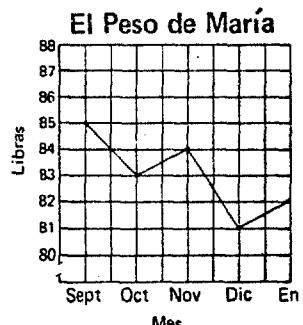
- A alquiler
- B comida
- C ahorros
- D ropa

El Presupuesto de la Sra. Pérez



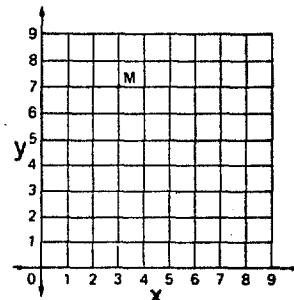
- 4 De acuerdo con la gráfica de abajo, ¿cuánto pesaba María en diciembre?

- E 81 libras
- F 82 libras
- G 83 libras
- H 84 libras



- 5 De acuerdo con la gráfica de abajo, ¿cuál es el par ordenado de números que muestra el punto M?

- A (3, 7)
- B (4, 7)
- C (7, 3)
- D (8, 3)



- 6 ¿Cuál de las siguientes fracciones tiene más valor?

- E $\frac{1}{3}$
- F $\frac{1}{4}$
- G $\frac{1}{5}$
- H $\frac{1}{6}$

- 7 ¿Cuál de los siguientes números es la forma correcta de representar cuatro mil siete?

- A 407
- B 4,007
- C 4,070
- D 47,000

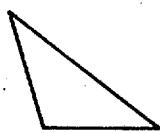
8 En el número 7,341.825 , ¿cuál dígito está en el lugar de las centenas?

- E 2
- F 3
- G 4
- H 5

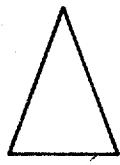
9 ¿Cuál de los siguientes números representa menos valor?

- A $\frac{1}{2}$
- B $\frac{1}{3}$
- C $\frac{2}{1}$
- D $\frac{1}{1}$

10 ¿Cuál de los siguientes triángulos es equilátero?



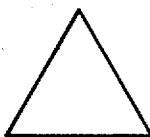
E



F



G



H

11 ¿Como cuántos cuartos de líquido crees que hay en esta botella de un galón?

- A 1 cuarto
- B 2 cuartos
- C 3 cuartos
- D 4 cuartos



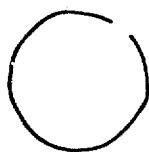
12 Las pulgadas cuadradas se usan para expresar

- E área
- F longitud
- G volumen
- H perímetro

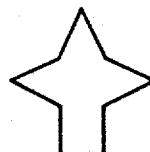
13 ¿Cuál de estas figuras es cerrada?



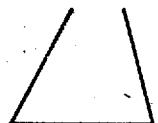
A



B



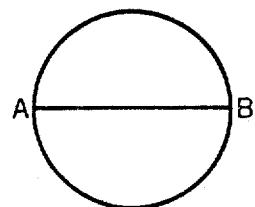
C



D

14 En este dibujo de un círculo, el segmento de la recta AB se llama

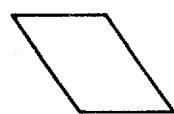
- E radio
- F diámetro
- G hipotenusa
- H circunferencia



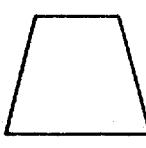
15 ¿Cuál de estas figuras es un paralelogramo?



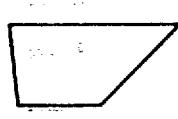
A



B

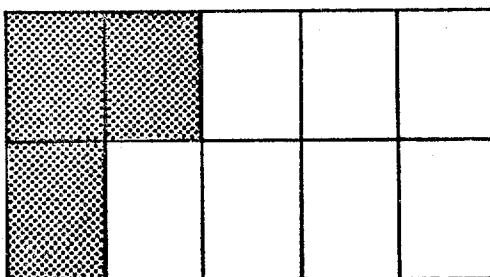


C



D

- 16 ¿Qué fracción de esta figura está sombreada?



- E $\frac{1}{5}$
F $\frac{3}{10}$
G $\frac{3}{5}$
H $\frac{7}{10}$

- 17 Tres niños median respectivamente 58, 61, y 66 pulgadas de altura. ¿Cómo puedes encontrar el promedio de su altura?

- A suma las alturas
B usa 61 como promedio
C suma las alturas y divide el resultado entre 3
D suma las alturas y multiplica el resultado por 3

- 18 El Sr. García lavó 23 ventanas diariamente durante 8 días. ¿Cómo puedes encontrar cuántas ventanas lavó en total?

- E suma 23 y 8
F divide 23 entre 8
G multiplica 23 por 8
H resta 8 de 23

- 19 ¿Cuál de las siguientes es la distancia más larga?

- A 1 pie 3 pulgadas
B 16 pulgadas
C 14 pulgadas
D 1 pie 6 pulgadas

- 20 Un cuarto mide 8 yardas de ancho. ¿Cómo puedes encontrar cuántos pies mide de ancho?

- E divide 8 entre 3
F suma 3 y 8
G multiplica 8 por 3
H resta 3 de 8

- 21 ¿Qué es lo que necesitas saber para encontrar el promedio de las galletas hechas por 7 estudiantes?

- A el tamaño de las galletas
B qué estudiante hizo la mayor cantidad de galletas
C qué estudiante hizo la menor cantidad de galletas
D cuántas galletas hicieron todos los estudiantes

- 22 ¿Cuál de estas oraciones numéricas no es cierta?

- E $67,776 > 66,767$
F $38,740 > 37,840$
G $93,302 > 93,203$
H $88,558 > 88,585$

- 23 Siete clases compraron boletos para el circo. Cada clase compró 29 boletos. ¿Cómo puedes encontrar cuántos boletos compraron en total todas las clases?

- A divide 29 entre 7
B multiplica 29 por 7
C suma 7 y 29
D resta 7 de 29

- 24 Juntos, Juan y Carlos tienen 17 cartas. Juan tiene 1 carta menos que Carlos. ¿Cuántas cartas tiene Juan?

- E 6
F 8
G 16
H 18

25 Los lápices cuestan 9¢ cada uno. ¿Cómo puedes encontrar cuánto cuestan 14 lápices?

- A suma 9¢ y 14
- B divide 14 entre 9¢
- C multiplica 14 entre 9¢
- D resta 9¢ de 14

26 Fíjate en estos dos conjuntos:

$$X = \{0, 2, 4, 5\} \quad Y = \{1, 2, 5\}$$

¿Cuál de los siguientes conjuntos se formará al unir los dos conjuntos?

- E $\{2, 5\}$
- F $\{1, 2, 4, 5\}$
- G $\{0, 1, 2, 4, 5\}$
- H $\{0, 1, 2, 3, 4, 5\}$

27 Si $n \times 5 = 8 + n$,

¿a qué equivale la n ?

- A 1
- B 2
- C 3
- D 4

28 ¿Cuál de los números siguientes va en el cuadro para hacer que esta oración numérica sea cierta?

$$8 + 4 = 19 - \square$$

- E 0
- F 1
- G 3
- H 7

29 Si $n \times 8 = 10 \times 4$,
¿a qué equivale la n ?

- A 1
- B 5
- C 6
- D 7

30 ¿Cuál de las combinaciones siguientes va en el cuadro para hacer que esta oración numérica sea cierta?

$$21 - 7 = \square$$

- E $9 - 6$
- F 3×4
- G $32 - 8$
- H $12 + 2$

31 Hay sólo tres números que hacen que esta oración numérica sea cierta. ¿Cuál de los grupos de abajo contiene estos tres números?

$$7 + \square < 10$$

- A $\{0, 1, 2\}$
- B $\{1, 2, 3\}$
- C $\{2, 3, 4\}$
- D $\{4, 5, 6\}$

32 ¿Cuál es el número que sigue?

$$57, 64, 71, 78, \underline{\hspace{1cm}}$$

- E 79
- F 81
- G 85
- H 88

33 Raúl tenía 7 canicas. Felipe usó 3 de ellas.
¿Qué fracción de las canicas usó Felipe?

- A $\frac{3}{7}$
- B $\frac{1}{2}$
- C $\frac{4}{7}$
- D $\frac{7}{3}$

34 Si José tiene 3 monedas de veinticinco centavos y Pedro tiene 3 de a diez, ¿cuánto dinero tienen entre los dos juntos?

- E \$0.60
- F \$0.75
- G \$1.05
- H \$1.50

- 35 En un mapa, 1 pulgada = 16 millas. ¿Cuántas millas representan 3 pulgadas en el mapa?

A 19 millas
B 48 millas
C 52 millas
D 96 millas

- 36 ¿Cuál es el número que falta?

405, 402, ___, 396

E 398
F 399
G 400
H 401

- 37 El impuesto es 3¢ por cada dólar. ¿Cuál es el impuesto en \$10.00?

A 3¢
B 13¢
C 30¢
D 33¢

- 38 ¿Cuál es la fecha una semana después del 3 de junio?

E 4 de junio
F 9 de junio
G 10 de junio
H 13 de junio

- 39 Una tabla de 2 pies de largo cuesta 24¢. Jorge necesita una tabla de 6 pies de largo. ¿Cuánto costaría esa tabla?

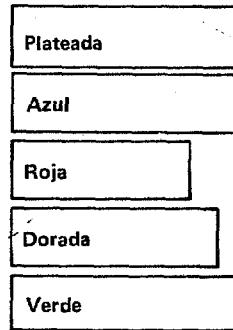
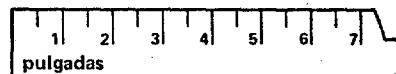
A 12¢
B 24¢
C 48¢
D 72¢

- 40 ¿Cuál es la fracción que falta?

$$\frac{1}{5}, \frac{3}{15}, \underline{\quad}, \frac{7}{35}$$

E $\frac{2}{10}$
F $\frac{4}{25}$
G $\frac{5}{25}$
H $\frac{6}{30}$

- 41 ¿Cuál de las reglas de abajo es 1 pulgada más corta que la regla plateada?



A la azul
B la roja
C la dorada
D la verde

- 42 Pepe recibe \$3.00 por semana. El ahorra $\frac{1}{4}$ de esa cantidad. ¿Cómo puedes encontrar cuánto ahorra cada semana?

E suma $\frac{1}{4}$ a \$3.00
F divide \$3.00 entre 4
G multiplica \$3.00 por 4
H resta $\frac{1}{4}$ de \$3.00

- 43 ¿Qué hora será 7 horas después de las 6.15 p.m.?

A 1.15 a.m.
B 7.15 a.m.
C 1.15 p.m.
D 7.15 p.m.

44 Alberto tenía 4 canicas más que Luis, y Carlos tenía 3 canicas menos que Luis. ¿Quién tenía más canicas?

- E Carlos
- F Luis
- G Alberto
- H no sé

45 Raúl tenía 49 manzanas. Las dividió igualmente entre sus 7 amigos. ¿Cuántas manzanas le tocaron a cada amigo?

- A 7
- B 8
- C 42
- D 56

46 ¿Cuánto cuestan 30 naranjas si 10 naranjas cuestan 59¢?

- E \$1.36
- F \$1.59
- G \$1.77
- H \$17.70

47 Manuel recorrió en su bicicleta 27 millas en 3 horas. ¿A cuántas millas por hora iba?

- A 9 mph
- B 24 mph
- C 30 mph
- D 81 mph

48 El Sr. Gómez compró una televisión. Debe pagar \$20.00 al mes durante 1 año para acabarla de pagar. ¿Cuánto le cuesta la televisión?

- E \$145.00
- F \$195.00
- G \$200.00
- H \$240.00

49 Lidia se ganó \$4.50, \$3.25, y \$2.25 ayudándole a su mamá. ¿Cuánto le falta para comprarse un vestido que cuesta \$16.75?

- A \$6.75
- B \$7.75
- C \$8.00
- D \$14.00

50 Mario hizo 12 operaciones en una prueba. Hizo el 50% de las operaciones. ¿Cuántas operaciones tenía la prueba?

- E 6
- F 24
- G 38
- H 62

APPENDIX II

Technical Mathematics Pre-Test/Post-Test for Miami Dade
Community College Participants

Nombre: _____

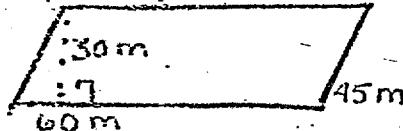
Fecha: _____

51) Convierta 500 Millas a Kilometros-

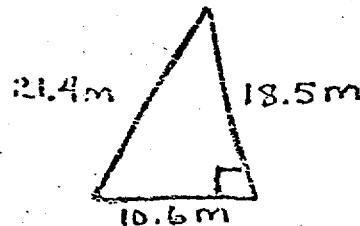
52) Convierta 0.068 Kilogramos a gramos-

53) Simplifique: $2^2 \times 3^3$ 54) Simplifique: $7^3 + 16^2 \div 2 + 18 \times 12^2 - 2592$

55) Busque el perimetro de la siguiente figura:



56) Busque el area de la siguiente figura:



57) Busque la circunferencia de un circulo con 2.5 cm de diametro.

59) Simplifie: $21 - (-13)$

60) Simplifie: $(-\frac{9}{11}) (121)$

61) Simplifie: $(-5ab) (16a^2b^2c)$

62) Simplifie: $\frac{-6a^2b^3}{-2ab^5}$

63) Simplifie: $(5p + q - 6) + (-11p - q + 4) + (4p - q - 2)$

64) Simplifie: $-2mn (4m - 3n)$

65) Evaluate: $-2(5r - s) + 4t$ si $r=5, s=-2, t=3.$

66) Despeje x: $\frac{x}{3} - 4 = 2$

67) Despeje y: $-2(4y + 1) = 3(4 - 2y)$

68) Despeje R: $\frac{3}{8} = \frac{5}{R}$

69) Despeje a: $A = \frac{1}{2}h(a + b)$

70) Despeje a: $V = V_0 + at$

71) Busque la secante de 240°

72) Si la tangente de un angulo es $\frac{3}{4}$ y la cosecante es negativa, busque el coseno de angulo.

113.

APPENDIX III

Industrial Electronics & Basic Electricity Pre-Test/Post-
Test for Miami Dade Community College Participants

NOMBRE: _____

FECHA: _____

I. Conecte con un flecha a la definicion:

- | | |
|---------------------|--|
| a. Voltaje (E) | 1. La unidad de corriente electrica |
| b. OHMS (R) | 2. Unidad para fuerza electromotiva |
| c. Amperio (I) | 3. Unidad de potencia aparente |
| d. Vatio (P) | 4. La unidad de resistencia electrica |
| e. Volt-Amperio | 5. Oposicion de un cambio en voltaje |
| f. Inductancia (L) | 6. Una unidad de poder |
| g. Capacitancia (C) | 7. Oposicion de un cambio en corriente |

2. Una forma de la Ley de OHM es _____

3. Una forma de la Ley de Poder es: _____

4. La cuarta banda de un resistor significa _____

5. Cual es el valor de cada resistor radial que tiene los siguientes codigos de color?

- | | | |
|----------------------------|-------|---|
| a. rojo, verde, dorado | _____ | / |
| b. amarillo, violeta, azul | _____ | / |
| c. naranja, negro, naranja | _____ | / |

6. Cual es el codigo de color para cada uno de estos resistores?

- | | | | |
|---------|-------|-------|-------|
| a. 56/ | _____ | _____ | _____ |
| b. 47K/ | _____ | _____ | _____ |
| c. 27K/ | _____ | _____ | _____ |

7. Existe un corto circuito entre dos puntos cuando la resistencia entre los dos puntos es _____

8. Cual es la resistencia que existe en un circuito abierto _____ 66

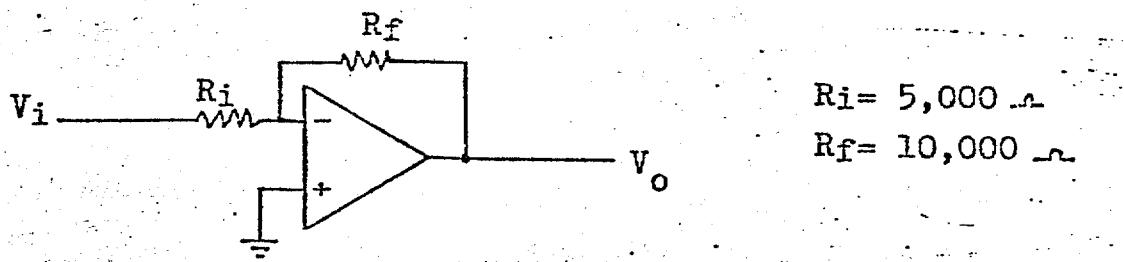
9. El voltaje que produce 5 Amperos sobre una resistencia de 100 OHM es: _____ y la potencia de este resistor es: _____
10. Cual es la corriente que existe en un circuito cerrando con una fuente de 20-V y tres resistores de 1,000 (cada uno) en serie? es _____ A, o _____ MA
11. El germanio en su forma pura es un _____ (Conductor/Aislante).
12. La tension de polarizacion directa aplicada a los terminales de un Diodo de Silicio debe ser igual o mayor que _____ V para que el Diodo conduzca apreciablemente.
13. La resistencia directa de un Diodo de Silicio es _____, la resistencia inversa es _____. (Alta/Baja)
14. Cuando se utiliza como regulador de tension un Diodo Zener debe ser polarizado en sentido _____ (Directo/inverso).
15. _____ es el proceso en el cual la c.a. se convierte en c.c.
16. Para invertir la polaridad de la forma de onda de salida en un rectificador de media onda es necesario invertir _____ en el circuito.
17. Dibuje la salida no filtrada de un rectificador de onda completa:
18. Dibuje la salida de un rectificador de onda completa despues de ser filtrada por un capacitor.

- a. el emisor
- b. la base
- c. el colector
- d. que esta malo

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20. La union emisor base de un transistor esta polarizada en _____ la union colector-base esta polarizada en _____ (Operacion Normal)
21. La ganancia de corriente en una configuracion de emisor comun (transistor) se llama _____.
22. La _____ de un transistor es la medida de la aptitud de la base para controlar la corriente de colector.
23. La resistencia directa de la union emisor-base de un transistor mide 10,000 . El transistor esta en _____ (Buen/Mal) estado.
24. La finalidad de un transformador audio de salida es transferir _____ desde la estapa de salida audio hasta el _____.
25. El canal de un JFET puede ser restringido hasta que la corriente de drenador se anule. _____ (si/no)
26. Los multivibradores son osciladores que generan ondas senoidales (verdad/Falso).
27. El SCR es un diodo que:
 - a. No trabaja frio
 - b. Se puede controlar
 - c. Sirve como transistor
28. El UJT es un transistor bipolar _____ (Verdad/Falso)

29. Un amplificador diferencial es: 118.
- a. Un circuito simetrico que utiliza dos transistores.
 - b. Un circuito que utiliza dos transistores en cascada.
 - c. Un circuito simetrico que solamente utiliza un transistor.
 - d. Un circuito que utiliza respuestas a. y b.
30. Un _____ es un ejemplo de un circuito integrado lineal.
31. En un OPAMP es posible cambiar la ganancia del amplificador mediante la adición de _____.
32. Cuál es la ganancia del circuito dibujado?



33. Cuál circuito no se puede realizar con un OPAMP?

- a. Amplificador
- b. Amplificador con inversión
- c. Oscilador
- d. Regulador
- e. Inductor
- f. Amplificador sumador

34. Los voltajes normales para operación de un OPAMP son:

- a. +5 V, y -15 V
- b. +10 V, y -5 V
- c. +10 V y -10 V
- d. Ninguna de las respuestas

35. La tensión necesaria para operación normal de TTL es ____ V.

36. Otro nombre para un multivibrador biestable es un _____.

37. Para que un LED emita luz debe estar _____ polarizado.
119.
38. Un numero escrito en forma binaria tiene cuantos valores en decimal equivalente? _____
39. El numero 6 escrito en forma binaria es _____.
40. La salida de un inversor digital es _____ la entrada.
De ejemplos:
41. El simbolo de un inversor es: _____
42. Si cada una de las entradas de una puerta NO-Y de tres entradas esta a nivel ALTO, la salida esta a nivel _____ (ALTO/BAJO).
(NAND)
43. El simbolo de una puerta NO-O de tres entradas es: _____
(NOR)
44. El numero Binario 100101 es igual a _____ en decimal.
45. El termistor es un semiconductor que se utiliza para medir temperatura. Qual fenomeno influido por temperatura se figura?

46. Un transductor de temperatura que utiliza el fenomeno de crear f.e.m. en la union de dos metales distintos se llama: _____
47. Una clase de transductor de presion es _____.
48. Un transductor acustico se puede llamar un _____.
49. Que quiere decir contactos "normalmente abiertos" ?

50. Listar cuatro funciones basicas que debe realizar un controlador completo de motor;

120.

51. Es practico dar marcha lenta a un motor sin carga?

52. Anote las desventajas y ventajas del arranque de un motor de corriente directa con fuente variable en comparacion con el arranque con resistencia de armadura.

53. En que consiste el frenado dinamico?

54. Explique la diferencia entre un interruptor de leva y un interruptor de tambor:

55. El arqueo es mas pronunciado cuando los contactos interrumpen corriente directa que cuando interrumpen corriente alterna?

56. Como puede aumentarse la velocidad de un motor de c.d. en paralelo por encima de su velocidad normal?

57. Explique como se debe hacer a un motor de c.d. para que el motor funcione normalmente en la direccion opuesta:

58. Porque los capacitores de arranque generalmente son electroliticos no polarizados en lugar de los de tipo de aceite?

59. Explique como se produce un campo rotatorio en un motor de arranque por capacitor:

121.

APPENDIX IV

Miami Dade Community College Follow-Up & Evaluations
in Honduras

APPENDIX IV

MIAMI DADE COMMUNITY COLLEGE FOLLOW-UP EVALUATIONS IN HONDURAS

Evaluation of the Training by Participants and their Supervisors

Approximately one-half of the supervisors and managers were hesitant about filling out evaluation forms because they felt they had not had enough time to evaluate the effects of the training. These supervisors, however, made favorable statements about the training experience. The responses elicited through the questionnaire were also favorable and are summarized below.

Evaluations of Training by Supervisors of Participants

Criteria	Evaluation									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Improved technical skills							1	2	3	4
Improved supervisory skills							1	2	3	3
Improved teaching skills							1	1	2	3
Value of work experience in Miami industry							1	3	2	1
Relevance of the training provided						1	-	2	1	3
Value of the training for the participant							2	3	5	1
Closer ties between INFOP and industry						1	-	1	2	1
Prev. maintenance, safety, & quality control						2	1	2	2	2
Communication of training plans to management for multiplier effect						1	-	1	2	4
Improved behavior with supervisors of the participant and employees						1	-	2	4	4
TOTALS:						2	3	9	18	24
										14

The table allows one to calculate an overall, average evaluation of 8.07, out of a possible score of 10, as rated by the supervisors of the project's participants.

In addition, supervisors provided additional comments which were reported in the Miami Dade Final Report:

-More emphasis should be given to needs assessments and detailed training plans. Instructors who are to train participants should conduct the needs assessments.

-The training program was too short (similar German programs are 6 months or longer). More workplace experience in U.S. industry would be helpful.

-Machinist (Mechanics) training was disorganized because of changing tutors and failing to complete the prepared curriculum.

-Electronics training should have allowed more time for laboratory activities.

-Some of the peers of participants are jealous because they were not chosen to participate in the training. An opportunity for these individuals would be helpful.

The Miami Dade Final Report also noted that "many favorable statements were made of a general nature which did not address any of the specific points covered in the questionnaire. The over all tone of the results was positive." But, "The specific plans for initiating the training of other technicians by the participants were not carried out on schedule."

Participants' Evaluation of Supervisory Skills

Participants were asked to evaluate the value of the supervisor training course and comment on how this instruction might be applied towards improving different aspects of their own institutions' policies. These evaluations are summarized below.

1. Quality Control

Industrial quality control was not considered to be applicable for INFOP participants. Participants from industry, however, explained that the course helped them understand their firms' systems of quality control and helped the participants provide better supervision of workers in this area.

2. Training of Others

INFOP participants reported a lack of flexibility in administrative procedures which make the implementation of new training plans difficult. Participants from industry submitted training plans to their supervisors but they had been too busy to initiate the training. Training that was being conducted was being done was of an informal nature. One firm, however, built a classroom for future training activities.

3. Preventative Maintenance

INFOP participants felt that existing maintenance programs were satisfactory. Four industrial participants explained that existing maintenance programs were good but were not being followed. Three participants had initiated new maintenance plans and two had reworked or moved electrical installations and control panels for improving maintenance.

4. Safety Rules and Measures

The INFOP instructor in La Ceiba found existing measures to be inadequate because the metal shop and electrical shop share the same facilities. Other INFOP participants felt that existing measures were satisfactory.

Industrial participants had varying responses. Although the use of gloves, protective face masks, and helmets are part of several firms' safety codes, these codes are routinely disregarded by workers -- but the course raised the level of awareness of participants regarding the importance of safety.

One installed an emergency electrical cut-off system. Several introduced policies requiring the approval of a supervisor before new electrical installations were used. Two covered bare or exposed wires to improve safety in their plants.

5. Personnel Evaluation Systems

INFOP personnel were not satisfied with their evaluation system because it is ambiguous and allows favoritism in making promotions.

Four industrial participants explained that their firms' had no effective evaluations of personnel. Three reported good evaluation systems. While all of the industrial participants said they were more aware of the need for fair and measurable evaluation systems, they did not have specific suggestions for improving existing systems.

6. Measures to Improve Motivation and Productivity

INFOP participants complained of administrative difficulties in making changes for improving motivation and productivity. They also noted that current measures only encourage personnel to do the minimum required.

Industrial participants expressed interest in more direct communications with management, social gatherings of firm employees, free time for attending technical courses, and increased salaries.

7. Communications within the Firm or Institution

INFOP participants complained of impersonal written memos rather than verbal communications with supervisors.

Most of the industrial participants felt that communication within their firms was satisfactory but suggested that line supervisors should be taken into account when decisions are made. Three felt that more direct communications with managers would be helpful and all of the participants said they were more aware of the importance of good communications within a firm.

8. Professional Improvement Plans

INFOP instructors felt that studying outside of Honduras was more effective than in-country training programs.

Five industrial participants felt that INFOP's training programs were adequate; others felt that in-house training in their firms was more appropriate; many also felt that firms should encourage and allow employees to take technical courses during work hours.

9. Directing Meetings

INFOP participants felt that their meetings were often too informal, but pointed out that they now appreciated the importance of regular, well prepared meetings.

Both INFOP and industrial participants felt that they now appreciated the importance of asking suggestions from their co-workers before implementing new policies. And sensed that they were more respected in their institutions and were also more respectful towards their co-workers.

The exclusion of audiovisual methods in conducting meetings was viewed as a weakness of the course by the participants.

The Miami Dade Final Report concluded that while this portion of the evaluation did not allow for a quantification of responses, the information provided by participants indicated that the principal objectives of the course had been met.

INFOP instructors explained that they were now more concerned about contributing to a more flexible, production oriented approach to supervision.

Participants from industry felt that a follow-up course from INFOP would be helpful; and that they now identified themselves as supervisors with responsibilities for coordinating the work of others and communicating more effectively with management as a result of the course.

Evaluation of Training Programs Implemented by Participants

While both mechanics and electrical participants had worked on preparing instructional modules, which were to be used upon their return to Honduras, neither INFOP nor industrial participants conducted training courses which were based on their studies at Miami Dade Community College.

INFOP instructors complained of a lack of instructional materials for students and the inflexibility of curricula for offering new modules of study based on what they had learned through their studies in Miami.

Industrial participants were instructing other employees on an informal basis in conjunction with their supervisory responsibilities but no formal courses had been conducted by these participants.

Recommendations and Conclusions of the Miami Dade Community College Final Report

The following recommendations (conclusions) were made in the Miami Dade Final Report.

1. Successful short-term training in Spanish can be provided in technical fields to instructors/technicians from Honduras in Spanish speaking urban areas (of the U.S.) such as Miami.

2. The participants experienced cultural shock, especially during the fourth through the ninth weeks. Training was not unduly affected, but miscellaneous complaining abounded.

3. The insufficient individualization of training was the most important weakness of this experience. Dividing training groups into intermediate and advanced levels could be important for future programs.

4. A greatly improved understanding of the United States and its "system" was gained by the participants. Some had held "radical" political philosophies and were skeptical of program intentions at the start of the training.

5. A three to five month absence from home by established, married technicians is a feasible arrangement. Longer absences, however, would be more difficult for both participants and sponsoring companies. The type of training provided by Miami Dade provides a more immediate return than "mainstream" training in English.

6. The training of established technicians provides important linkages between industrial needs and demands on INFOP's services. But accomplishing a proper "fit" between industry and INFOP's technical offerings will require patience and perseverance on the parts of CADERH, INFOP and interested industrialists.

7. There is a need for ongoing revisions of training plans. The use of craft advisory committees would be the most appropriate means of realizing this end. This was an important lesson pointed out to participants and CADERH visitors.

8. AID's contribution to the reform of technical instruction in Honduras would appear to be best directed towards existing technicians in industry. In-plant training by relatively short, skill up-grading courses promises to accomplish the best returns. This would also avoid duplications of efforts between AID and apprenticeship training that is supported by Germany and other donors.

9. CADERH should be urged to promote customized training in factories, making use of the training commitments made by firms and training institutions during this project.

10. Some of the problems that CADERH can anticipate in encouraging in-plant training are shortage of supplies, some reluctance by managers in providing machinery/equipment for

training, and a relative slowness of INFOP to adapt to such innovative instructional strategies. There are, however, notable exceptions to each of these potential problem areas.

11. AID/CADERH training initiatives could be strengthened if CADERH were allowed to grant tax rebates to firms that provided effective in-plant training. Presently a conflict of interests exists. Only INFOP can provide rebates and they are usually not given since funds would come from INFOP's operational budget.

12. Future programs should have less classroom time and more experience in the workplace. Subcontracts with industry could provide model in-plant training for future participants.

13. The socialization of knowledge that accompanies communal living arrangements is an advantage of short-term training. Training that is over five months in length should be designed for individual or separate living arrangements.

APPENDIX V

Impact Evaluation Questionnaire

CUESTIONARIO DE SEGUIMIENTO Y EVALUACION
FINAL DEL PROYECTO HONDURAS-MIAMI DADE
COMMUNITY COLLEGE
PROYECTO # 522 - (598) - 0622

LUGAR Y FECHA

NONBRE DEL ENTREVISTADO

POSICION O CARGO DEL ENTREVISTADO

NOMBRE Y DIRECCION DE LA EMPRESA

Nº Calle - Avenida

Lugar

Teléfono

Principales productos y/o servicios de la empresa

Participante

Supervisor

1. Al momento de ingresar al programa el aspirante confió en que adquiriría habilidades o destrezas en la operación o manejo de equipos, maquinaria y/o instrumentos. A la vez, espero adquirir conocimientos técnicos dentro de su especialidad.

Esas habilidades o destrezas y conocimientos que espero adquirir se enumeran a continuación:

<u>Equipos/Maquinaria/Instrumento</u>	<u>Destrezas</u>	<u>Conocimientos</u>
a.		
b.		
c.		
d.		

Se hicieron realidad esas expectativas?

Especificamente que maquinaria, equipo o instrumentos aprendió a mejorar, que destrezas y o conocimientos adquirió?

<u>Equipo /Maquinaria/Instrumento</u>	<u>Destrezas</u>	<u>Conocimientos</u>
a.		
b.		
c.		
d.		

Cuales de estas destrezas y conocimientos está aplicando en la actualidad?

<u>Equipo/Maquinaria/Instrumento</u>	<u>Destrezas</u>	<u>Conocimientos</u>
a.		
b.		
c.		
d.		

Cuales de esas destrezas y conocimientos adquiridos piensa que podrá aplicar en el futuro?

<u>Equipo/Maquinaria/Instrumento</u>	<u>Destrezas</u>	<u>Conocimientos</u>
a.		
b.		
c.		
d.		

Cuales de estas destrezas y conocimientos adquiridos no tienen aplicación en el futuro?

2. Que mejoras esperó obtener del programa en cuanto a sus habilidades de enseñanza y supervisión?

a.	
b.	
c.	
d.	

Cuales de esas habilidades logró mejorar?

a.	
b.	
c.	
d.	

Cuales de esas habilidades está aplicando actualmente?

a.	
b.	
c.	
d.	

Cuales de esas habilidades piensa que podrá aplicar en un futuro?

- a. _____
- b. _____
- c. _____
- d. _____

Cuales de las habilidades no tienen aplicación actualmente o en el futuro?

- a. _____
- b. _____
- c. _____
- d. _____

3. Planes para impartir los nuevos conocimientos y habilidades adquiridos que pensó podría desarrollar al regreso a sus labores?

- a. _____
- b. _____
- c. _____
- d. _____

Cuales de esos planes ha realizado?

Programas realizados : _____

Fechas : _____

Horario de Instrucción : _____

Total de horas-instrucciones impartidas. : _____

* Costos directos de Instrucción : _____

Resultados de la instrucción : _____

* Sueldo del Instructor durante preparación y ejecución de la Instrucción, materiales y otros insumos.

Que programas anticipa podrá poner en ejecución en un futuro?

4. Mejoras específicas en habilidades (conocimientos y técnicas) como resultado de participación en el programa Miami-Dade:

	Ninguno	Poco	Algo	Mucho	Se utilizan Actualmente (Si/No)
Supervisión de Personal	_____	_____	_____	_____	_____
Motivación de Personal	_____	_____	_____	_____	_____
Comunicación con Personal	_____	_____	_____	_____	_____
Evaluación de Personal	_____	_____	_____	_____	_____
Delegación de Responsabilidades.	_____	_____	_____	_____	_____
Como conducir reuniones	_____	_____	_____	_____	_____
Comunicación con supervisores.	_____	_____	_____	_____	_____
Productividad de Personal	_____	_____	_____	_____	_____
Identificación de Necesidades de Instrucción.	_____	_____	_____	_____	_____
Desarrollo de Planes de Instrucción	_____	_____	_____	_____	_____
Evaluación de Participantes.	_____	_____	_____	_____	_____
Conocimientos técnicos	_____	_____	_____	_____	_____
Destrezas técnicas nuevas	_____	_____	_____	_____	_____
Operación de máquinas o equipos nuevos.	_____	_____	_____	_____	_____
Seguridad industrial	_____	_____	_____	_____	_____
Instrucción en base a competencias.	_____	_____	_____	_____	_____
Pedagogía (como conducir una clase o curso)	_____	_____	_____	_____	_____

5. Si Usted ha recibido cursos de capacitación o complementación dentro del país, cual es su experiencia con respecto a esos cursos?

a. _____

b. _____

c. _____

d. _____

6. Que sugerencias tiene Usted para mejorar la calidad y aplicabilidad de dichos cursos?

a. _____

b. _____

c. _____

d. _____

7. Si es Usted supervisor; que experiencias tiene Usted con los cursos de capacitación o complementación que han recibido las personas bajo su supervisión?

a. _____

b. _____

c. _____

d. _____

8. Si se presentara la oportunidad de seguir instruyéndose en la rama que Usted domina cuales serían sus sugerencias para el óptimo uso de tal oportunidad?

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